



AIR MEASUREMENT SERVICES, INC.

Horizon Test #: W07-039-FRA

Date Tested: April 20, 2004

Report Date: June 8, 2004

Revision Number: 0

**ANNUAL EMISSIONS TEST
OF LANDFILL GAS FLARE #1
BRADLEY LANDFILL**

Permit to Construct No. 370136

Prepared for:

Waste Management Recycling and
Disposal Services of California, Inc.
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Sun Valley, California 91352

Prepared by:

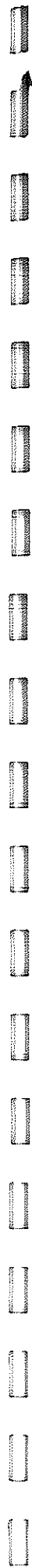
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HORIZON

AIR MEASUREMENT SERVICES, INC.

June 8, 2004

Mr. Bruce Matlock
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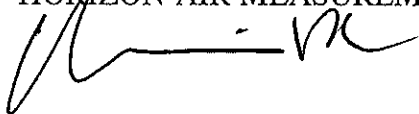
Dear Mr. Matlock:

Please find enclosed three copies of the final report entitled "Annual Emissions Test of Landfill Gas Flare #1."

If you have any questions please call me at (805) 498-8781.

Sincerely,

HORIZON AIR MEASUREMENT SERVICES, INC.



Robert D. Carrier
Project Manager

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1. INTRODUCTION

Under the Bradley Landfill and Recycling Center (BLRC) site specific Rule 1150.1 compliance plan, Waste Management Recycling and Disposal Services of California, Inc. is required to conduct an annual source test on landfill gas Flare #1 located at BLRC (Permit to Construct #370136). Horizon Air Measurement Services, Inc. (Horizon) had been retained for this purpose.

All testing/analytical procedures conformed to those outlined in Horizon Test Plan No. W07-013-TP, which had been previously approved by the South Coast Air Quality Management District (SCAQMD). Horizon completed the source testing on April 20, 2004.

Two samples were taken for each parameter of interest (Table 1-1) with the exception of trace organic compounds and reduced sulfur compounds, for which only one sample per location was collected. The results of the testing program, with respect to Permit limits, are provided in Section 2 - Results Summary.

A brief description of the flare and flare operating conditions during testing is provided in Section 3. Section 4 provides a summary of sampling/analytical procedures utilized. Section 5 provides a more detailed results summary/discussion.

Table 1-1
Compounds of Interest - Flare #1
Waste Management - Bradley Landfill
April 20, 2004

Parameter	Location	Method	Number of Samples Per Source
Total Non Methane Hydrocarbons	Inlet	SCAQMD Method 25.1	2
	Outlet	SCAQMD Method 25.3	2
Reduced Sulfur Compounds (C ₁ -C ₃) Including H ₂ S	Inlet	SCAQMD Method 307.91 Equivalent	1
Speciated Organic Compounds	Inlet	Whole Air/GC-MS (1150 list)	1
	Outlet	Whole Air/GC-MS (1150 list)	1
Particulate Matter	Outlet	SCAQMD Method 5.1	2
Oxides of Nitrogen	Outlet	SCAQMD Method 100.1	2
Carbon Monoxide	Inlet	SCAQMD Method 25.1	2
	Outlet	SCAQMD Method 100.1	2
Oxygen	Inlet	SCAQMD Method 25.1	2
	Outlet	SCAQMD Method 100.1	2
Carbon Dioxide	Inlet	SCAQMD Method 25.1	2
	Outlet	SCAQMD Method 100.1	2
Methane	Inlet	SCAQMD Method 25.1	2
	Outlet	SCAQMD Method 25.3	2
Flow Rate/Temperature	Inlet	SCAQMD Method 2.3	2
	Outlet	SCAQMD Method 5.1/Calculated	2
Moisture	Outlet	SCAQMD Method 5.1	2
	Inlet	SCAQMD Method 4.1	2
BTU Content	Inlet	SCAQMD Method 25.1	2

2. SUMMARY OF RESULTS

The results of the testing program conducted on Flare #1 are provided in Table 2-1. Emission rates of oxides of nitrogen, carbon monoxide, total particulate matter, total non-methane organics and total sulfur compounds (as SO₂) were within PTC 370136 (see Appendix H) limitations.

A more detailed discussion of results is provided in Section 5.

Table 2-1
Summary of Results
Flare #1
Waste Management - Bradley Landfill
April 20, 2004

Parameter	Measured Emission Rate*	Permitted Emission Rate
Inlet Gas Flow Rate	3858 dscfm	5556 cfm
Oxides of Nitrogen, as NO ₂	2.64 lb/hr 0.027 lb/MMBtu	10.0 lb/hr, 0.06 lb/MMBtu
Total Particulate Matter	1.69 lb/hr	3.0 lb/hr
Carbon Monoxide	21.9 lb/hr	33.3 lb/hr
Total Non Methane Organics, as CH ₄	0.624 lb/hr	1.86 lb/hr
Total Non Methane Organics, as C ₆	2.20 ppm C ₆ @ 3% O ₂	20 ppm C ₆ @ 3% O ₂ (Rule 1150.1)
Total Sulfur Compounds, as SO ₂	3.07 lb/hr	8.44 lb/hr

* Measured emission rates shown are the average of two test runs (samples).

3. FLARE DESCRIPTION AND OPERATION

3.1 Flare Description

The landfill gas flare is a John Zink enclosed flare consisting of an insulated steel cylinder 60 feet high and 156 inches outside diameter (see Figure 3-1). The flare is equipped with a multi-jet burner, a propane gas pilot, electric igniter, UV flame sensor, thermocouple with temperature indicator and recorder, automatic shutdown and alarm system, automatic combustion air regulating system, temperature controller and flare arrestor. Landfill gas is supplied by a 200 horsepower (Hp) blower (one blower is standby). Operating landfill gas flow rate is limited, by the Permit, to 5556 cubic feet per minute. Landfill gas flow rate was continuously monitored using an annubar and is recorded digitally by the facility. Flare temperature and condensate injection rate was also continuously monitored by the facility.

Condensate flow rate is limited to five gallons per minute by the Permit.

3.2 Sample Location

Flare exhaust samples were obtained from each of two ports positioned at right angles, located five feet (0.4 diameters) from the top of the flare (144 inches inside diameter) and approximately 55 feet (4.6 diameters) above ground level.

Inlet samples and measured flow rate were obtained from the 14-inch diameter (13.25 inch inside diameter) landfill gas line supplying the flare at a location 144 inches (10.9 diameters) downstream and 93 inches (7.0 diameters) upstream of any flow disturbance.

3.3 Flare Operation During Testing

The following operating conditions were maintained during the emissions testing:

	<u>Run 1</u>	<u>Run 2</u>
Flare Temperature -	1677 °F	1685 °F
Landfill Gas Flow Rate -	3844 scfm	3799 scfm
Condensate Injection Rate -	3.1 gpm	0.0 gpm

The condensate injection operated in the normal automatic mode. Flare process data is provided in Appendix G.

4. SAMPLING/ANALYSES

The sampling/analytical program had been designed to quantify the parameters of interest outlined in Table 1-1.

4.1 Sample Location

4.1.1 Flare Exhaust

At the flare exhaust 24 sample points (12 per diameter), determined in accordance with Method 1.1, were utilized for the determination of the following compounds:

- particulate matter
- NO_x
- CO
- O₂/CO₂
- flow rate
- moisture

The exact locations of the sampling points are provided in Appendix D, Field Data Sheets. A description of SCAQMD Method 1.1 is provided in Appendix A.

One sample point near the center of the stack was utilized for the collection of the following compounds:

- speciated organic compounds
- total non methane hydrocarbons
- methane

4.1.2 Landfill Gas Supply Line

Twelve sample points (six per diameter), determined in accordance with Method 1.1, were used for collection of the following parameter:

- flow rate

The exact locations of the sampling points are provided in Appendix D, Field Data Sheets. A description of SCAQMD Method 1.1 is provided in Appendix A.

A single sample point was utilized for the collection of the following compounds:

- total non methane hydrocarbons
- methane
- CO
- CO₂/O₂
- reduced sulfur compounds
- speciated organic compounds
- BTU content
- moisture

4.2 Moisture

4.2.1 Inlet - SCAQMD Method 4.1

Landfill gas moisture content was determined using SCAQMD Method 4.1. Two, one hour test runs were conducted in conjunction with the outlet particulate and SCAQMD Method 100 testing. A description of SCAQMD Method 4.1 is provided in Appendix A.

4.2.2 Outlet - SCAQMD Method 5.1

Moisture content of the flare exhaust was determined using SCAQMD Method 4.1 in conjunction with SCAQMD Method 5.1, as detailed in Appendix A.

4.3 Flow Rate

4.3.1 Inlet - SCAQMD Method 2.3

Landfill gas flow rate was determined using SCAQMD Method 2.3. A description of SCAQMD Method 2.3 is provided in Appendix A.

4.3.2 Outlet - SCAQMD Method 5.1

The landfill flare flow rate was monitored in conjunction with SCAQMD Method 5.1, as detailed in Appendix A. However, since the flare exhaust velocity was below the applicable limit (0.05 in. WG ΔP) of SCAQMD Method 2.1/5.1, the exhaust flow rate was calculated stoichiometrically based upon the landfill gas composition and stack dilution.

4.4 Particulate Matter (Outlet) - SCAQMD Method 5.1

Horizon conducted two, 60-minute test runs on the flare exhaust for particulate matter determination in accordance with SCAQMD Method 5.1 protocol. Twenty-four traverse points were utilized for the collection of particulate matter at the flare exhaust. A description of SCAQMD Method 5.1 is provided in Appendix A. Stack gases were withdrawn through an integral quartz nozzle and probe.

4.5 Oxides of Nitrogen, Carbon Dioxide, Oxygen (Continuous Emissions Monitoring) - SCAQMD Method 100.1

Two, 60-minute test runs were conducted at the flare exhaust. Twenty-four sample points were utilized. All sampling was performed under the guidelines of SCAQMD Method 100.1 as detailed in Appendix A.

4.6 Hydrogen Sulfide (H₂S), and C₁ - C₃ Sulfur Compounds (Inlet) - SCAQMD Method 307.91 Equivalent

Hydrogen sulfide and C₁ - C₃ sulfur compound samples were collected at the inlet of the flare using the Tedlar bag collection system depicted in Appendix A. All system components coming in contact with the landfill gas were Teflon.

Hydrogen sulfide and C₁ - C₃ sulfur compounds were analyzed using a Method 307.91 equivalent by AtmAA, Inc. Equivalency had been formally granted by SCAQMD to AtmAA, Inc. for this Method.

4.7 Speciated Organic Compounds - SCAQMD Rule 1150.1 List

4.7.1 Inlet

Speciated organic compounds were collected at the flare inlet of the landfill gas using the Tedlar bag collection system depicted in Appendix A. All system components coming in contact with the landfill gas were Teflon or stainless steel. Speciated organic compounds (SCAQMD Rule 1150.1 list) were identified and quantified using GC/MS analytical procedures.

4.7.2 Outlet

Speciated organic compound samples were collected in conjunction with the particulate/CEM testing at the outlet using the Tedlar bag method depicted in Appendix A. Each sample was then analyzed for speciated organic compounds (SCAQMD Rule 1150.1 list) using GC/MS procedures.

4.8 Total Non Methane Hydrocarbons, Methane, Carbon Dioxide and Carbon Monoxide

4.8.1 Inlet - SCAQMD Method 25.1

Total non methane hydrocarbons, methane, CO₂ and CO concentration were determined at the flare inlet from duplicate samples using SCAQMD Method 25.1. A description of SCAQMD Method 25.1 is provided in Appendix A.

4.8.2 Outlet - SCAQMD Method 25.3

Duplicate samples were obtained for total non methane hydrocarbon and methane concentration determination using SCAQMD Method 25.3. A description of SCAQMD Method 25.3 is provided in Appendix A.

4.8.3 Carbon Monoxide

Carbon monoxide concentration was determined at the exhaust location from analysis of samples gathered in Tedlar bags using South Coast Air Quality Management District Method 10.1.

5. RESULTS DISCUSSION

Detailed results of the criteria testing conducted on Flare #1 on April 20, 2004 are presented in Table 5-1. Speciated organic compound destruction efficiencies and emission rates are provided in Table 5-2. Since the flare exhaust velocity was below the applicable range ($>0.05 \Delta P$ inches water gauge) of SCAQMD Method 2.1, the flare exhaust flow rate for each test run was calculated stoichiometrically based upon the composition of the landfill gas and the exhaust stack dilution. Oxide of sulfur emission rate was calculated based upon the landfill gas total sulfur compound concentration and flow rate (see Appendix B).

Test Critique

No sampling or analytical problems or Method deviations were encountered during any phase of the test program, with the following exception:

During the test program, carbon monoxide concentrations exceeded the scale (100 ppm) of the SCAQMD Method 100.1 analyzer. As the next available scale (1000 ppm CO) could not necessarily demonstrate compliance (at the minimum reportable 20% of instrument scale), integrated samples for CO were gathered in Tedlar bags for analysis by SCAQMD Method 10.1.

Table 5-1
Summary of Results
Waste Management - Bradley Landfill
Flare #1
April 20, 2004

	LANDFILL GAS			FLARE EXHAUST		
Run Number	1	2	Avg.	1	2	Avg.
STACK GAS CHARACTERISTICS						
Temperature, degrees F	165	158	162	1527	1520	1524
Moisture, %	6.4	7.3	6.8	9.4	7.9	8.7
Flow Rate, acfm	4899	5096	4997			
Flow Rate, dscfm	3789	3928	3858	41474	* 42817	* 42146
Fixed Gases						
Oxygen, %	1.59	-	1.59	12.97	12.94	12.95
Carbon Dioxide, %	36.15	-	36.15	6.92	6.99	6.95
Methane, %	41.75	-	41.75	0.00	0.00	0.00
BTU Value, Btu/scf	422	-	422	-	-	-
EMISSIONS						
Oxides of Nitrogen						
ppm	-	-	-	10.3	7.0	8.7
ppm @ 3 % O2	-	-	-	23.3	15.7	19.5
lb/hr	-	-	-	3.12	2.17	2.64
lb/MMBtu	-	-	-	0.033	0.022	0.027
Carbon Monoxide						
ppm	-	-	-	119	116	118
ppm @ 3 % O2	-	-	-	269	261	265
lb/hr	-	-	-	21.8	22.0	21.9
lb/MMBtu	-	-	-	0.228	0.222	0.225
Total Particulate Matter						
gr/dscf	-	-	-	0.00569	0.00368	0.00469
lb/hr	-	-	-	2.02	1.35	1.69
Total Non-Methane Hydrocarbons (Reactive Organic Compounds)						
ppm, as Methane	12027	-	12027	5.86	-	5.86
lb/hr, as Methane	117.3	-	117.3	0.624	-	0.624
Sulfur Compounds						
Hydrogen Sulfide, ppm	68.1	-	68.1	0.50	-	0.50
Total Sulfur, ppm as H2S	78.4	-	78.4	-	-	-
Oxides of Sulfur**						
lb/hr	-	-	-	3.07	-	3.07

* Flow Rate calculated stoichiometrically

** Calculated from sulfur balance

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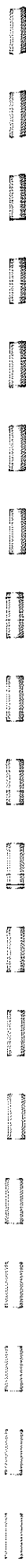
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Table 5-2
Trace Organic Species
Destruction Efficiency Results
Waste Management - Bradley Landfill
Flare #1
April 20, 2004

Species	Inlet		Outlet		Destruction Efficiency (%)
	Concentration (ppb)	Emission Rate (lb/hr)	Concentration (ppb)	Emission Rate (lb/hr)	
Hydrogen Sulfide	68100	1.42E+00	< 500	< 1.14E-01	> 91.98
Benzene	2720	1.29E-01	< 0.2	< 1.04E-04	> 99.92
Benzylchloride	< 40	< 3.10E-03	< 0.8	< 6.77E-04	NA
Chlorobenzene	152	1.05E-02	< 0.2	< 1.51E-04	> 98.56
Dichlorobenzenes	2120	1.90E-01	< 1.1	< 1.08E-03	> 99.43
1,1-dichloroethane	459	2.77E-02	< 0.2	< 1.32E-04	> 99.52
1,2-dichloroethane	96	5.77E-03	< 0.2	< 1.32E-04	> 97.71
1,1-dichloroethylene	64.9	3.84E-03	< 0.2	< 1.29E-04	> 96.63
Dichloromethane	1840	9.54E-02	1.04	5.89E-04	99.38
1,2-dibromoethane	< 30	< 3.44E-03	< 0.2	< 2.50E-04	NA
Perchloroethene	3160	4.57E-01	< 0.1	< 3.16E-04	> 99.93
Carbon tetrachloride	< 30	< 2.82E-03	< 0.1	< 1.03E-04	NA
Toluene	45600	2.56E+00	1.27	7.78E-04	99.97
1,1,1-trichloroethane	20.8	1.69E-03	< 0.1	< 8.86E-05	> 94.75
Trichloroethene	1160	9.27E-02	< 0.1	< 8.73E-05	> 99.91
Chloroform	< 20	< 1.45E-03	< 0.1	< 7.93E-05	NA
Vinyl Chloride	278	1.06E-02	< 0.2	< 4.16E-05	> 99.61
m xylenes	28200	1.82E+00	< 0.2	< 1.41E-04	> 99.99
o+p xylene	3900	2.52E-01	0.80	5.65E-04	99.78
TNMHC	12026890	1.17E+02	5855	6.24E-01	99.47

Note: All values preceded by "<" are below the detection limit - reported values are detection limit values.
NA--Not applicable: Destruction efficiency cannot be calculated since both inlet and outlet values are below the detection limit.



APPENDIX A - Sampling and Analytical Methods

Method:	Stack Gas Velocity and Volumetric Flow Rate From Small Stacks or Ducts
Applicable for Methods:	SCAQMD Method 2.3
Principle:	The average gas velocity in a stack gas is determined from the gas density and from measurement of the average velocity head with a standard pitot tube.
Sampling Procedure:	The velocity head and temperature is measured at the traverse points specified by SCAQMD Method 1.2. The static pressure in the stack and the atmospheric pressure is determined. The stack gas molecular weight is determined from independent measurements of O ₂ , CO ₂ and H ₂ O concentrations.
Sample Recovery: and Analyses:	The stack gas velocity is determined from the measured average velocity head, the measured dry concentrations of O ₂ and CO ₂ and the measured concentration of H ₂ O. The velocity is determined from the following set of equations:

Where,

ΔP = velocity head, inches in H₂O
Ts = gas/temperature, degrees R
Ps = absolute static pressure

Mwd = dry molecular weight
Mw = molecular weight
Cp = pitot flow coefficient

Dry molecular weight of stack gas

$$Mwd = 0.44 (\%CO_2) + 0.32 (\%O_2) + 0.28 (\%N_2 + \%CO)$$

Molecular weight of stack gas, wet basis

$$M_w = (M_{wd} \times M_d) + 18 (1 - M_d)$$

$$\text{Where, } M_d = \frac{100 - Bws}{100}$$

Stack gas velocity

$$(V_s)_{avg.} = (5130) C_p \times \sqrt{\Delta P_{avg.}} \times \sqrt{T_s} \times \left(\frac{1}{P_s \times M_w} \right)^{1/2}$$

Method:

Determination of Moisture in Stack Gases

Applicable for
Methods:

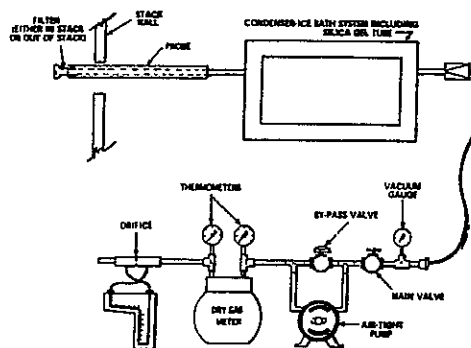
EPA Method 4, ARB 1-4, SCAQMD Method 4.1

Principle:

A gas sample is extracted at a constant rate from the source; moisture is removed from the stream and determined either volumetrically or gravimetrically.

Sampling Procedure:

Set up train as shown in the following figure. Sample is drawn at a constant rate through a sufficiently heated probe. The probe is connected to the impinger train by Teflon or glass tubing. The train consists of two greenburg smith impinger (SCAQMD 4.1) or one modified and 1 greenburg smith impinger (CARB & EPA) each containing 100 ml of water, an empty impinger as a knock-out and an impinger containing silica gel to protect the pump from moisture.



Sample Recovery:
and Analyses:

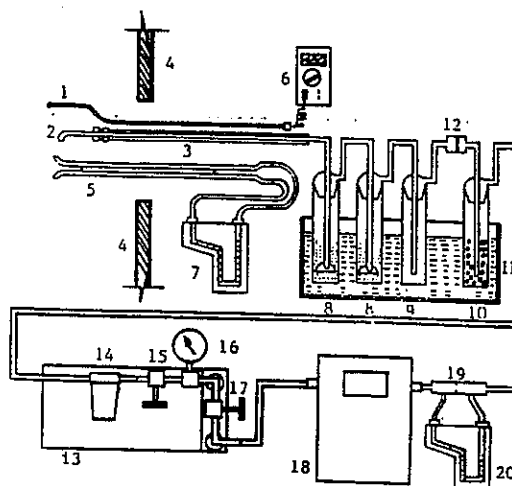
Following testing, moisture content is determined gravimetrically or volumetrically from initial and final impinger contents weights or volume.

Method: **Determination of Particulate Matter Emissions From Stationary Sources Using a Wet Impingement Train**

Reference: SCAQMD Method 5.1

Principle: Stack gas is withdrawn isokinetically from the source through a sample train. Particulate matter is collected in impingers containing deionized water and on a back-up filter. The impingers are contained in an ice bath to maintain a sampled gas temperature of approximately 15° C (60° F). The filter is not heated.

Sampling Procedure: The sampling train is shown in the figure below. The sample is drawn isokinetically through a glass or quartz probe (hi-temp). The probe is connected to an impinger train by Teflon tubing. The train consists of two Greenburg-Smith impingers which contain 100 ml of DI water; an empty impinger as a knock-out; and an impinger containing silica gel to protect the pump from moisture. Sample is withdrawn isokinetically from each predetermined sample point (determined using SCAQMD Method 1.1) through the sample train, which is followed by a vacuum line, a pump, a dry gas meter and a calibrated orifice.



- | | |
|--|---|
| 1. Temperature Sensor | 11. Ice Bath |
| 2. Nozzle | 12. Filter |
| 3. Glass Lined Stainless Steel Probe | 13. Sealed Pump (Leak Free) |
| 4. S-type Pitot Tube | 14. Filter for Pump |
| 5. Stack Wall | 15. Metering Valve |
| 6. Temperature Sensor Meter | 16. Vacuum Gauge |
| 7. Pitot Tube Inclined Manometer | 17. By-pass Valve |
| 8. Impinger with 100 ml H ₂ O | 18. Temperature Compensated Dry Gas Meter |
| 9. Empty Bubbler | 19. Orifice |
| 10. Bubbler with Silica Gel | |

Sample Recovery: The moisture content is determined either gravimetrically or volumetrically from initial and final impinger weights or volume. Then the filter, probe/impinger rinse (including nozzle rinse, liner rinse, impinger contents and rinses) and silica gel are recovered into Containers #1, #2 and #3, respectively.

Analytical Procedure: The aqueous sample is filtered through a tared fiberglass filter. An organic extraction is performed on the resulting solution using methylene chloride. Both the extraction filter and sample train filter are desiccated then measured gravimetrically. The organic extract and aqueous catch are evaporated, desiccated and measured gravimetrically.

If significant levels of sulfur compounds are present in the stack, each sample fraction is analyzed by acid-base titration for acid sulfate content and by barium-thorin titration for sulfate content.

Method: Carbon Monoxide by SCAQMD Micro Total Carbon Analyses

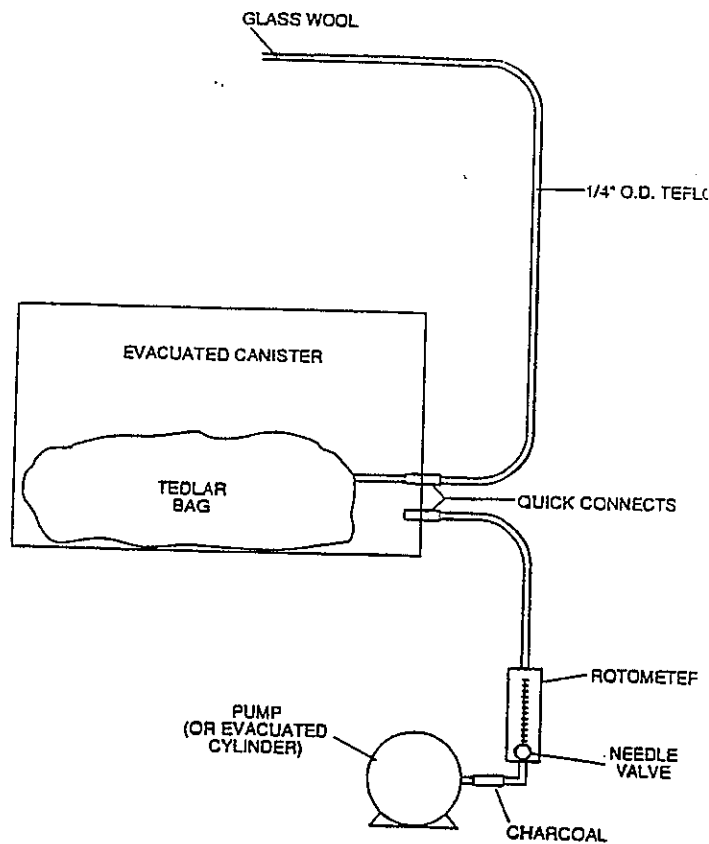
Reference: SCAQMD Method 10.1 (Tedlar Bag)

Principle: A Tedlar bag is filled with flue gas at a constant rate. The bag contents are analyzed by total combustion analyses/flame ionization detection for carbon monoxide.

Sampling Procedure: A gas sample is collected by evacuating the canister, see figure, at a constant rate over each test run using a rotameter/needle valve and a diaphragm pump. This causes the Tedlar bag to fill with stack gas at a constant rate while maintaining sample integrity.

Prior to each sampling run, the evacuated canister (containing the Tedlar bag) is leak checked at 2" Hg vacuum. The sample train upstream of the Tedlar bag is then purged with stack gas. At the conclusion of each test run, each Tedlar bag sample is sealed and stored in an opaque container pending analysis.

Analytical Procedure: Carbon monoxide concentration from the sample is determined using the SCAQMD Total Combustion Analysis (TCA) procedure.



Method:	Determination of Total Gaseous Non-Methane Organic Emissions as Carbon
Reference:	SCAQMD Method 25.1
Principle:	A sample of flue gas is drawn through a condensate trap and into an evacuated 12 liter tank. Volatile organic compounds (VOC), as total gaseous non-methane organics (TGNMO), are determined by combining results from independent analysis of condensate in the traps and gases in the tanks.
Sampling Procedure:	<p>Duplicate gas samples are withdrawn from a source at a constant rate through condensate traps immersed in dry ice followed by evacuated 12 liter (nominal) tanks. Heavy organic components condense as liquids and solids in the condensate traps. Lighter components pass as gases through the traps into the tanks. The combined results from tanks and trap analyses are used to determine a qualitative and quantitative expression of the effluent gas stream. Duplicate sampling is designed into the system to demonstrate precision.</p> <p>The sampling apparatus is checked for leaks prior to the sampling program by attaching the probe end to an absolute pressure gauge and vacuum pump in series. The sample lines were evacuated to less than 10 mm Hg and the gauge shutoff valve is then closed. The sample lines are deemed to be leak-free if no loss of vacuum occurs as indicated by the vacuum gauge. During sampling the tank pressures are monitored with a 0-30 inch vacuum gauge to ensure integrated sampling.</p> <p>The final vacuum of each sample is measured using a slack tube manometer. The sample is then pressurized to 800 mm Hg absolute with ultrapure nitrogen. Each sample is then analyzed using the SCAQMD TCA procedure for total non methane hydrocarbons.</p>
Analytical Procedure:	<p>Condensate traps are analyzed by first stripping carbon dioxide (CO₂) from the trap. The organic contents are then removed and oxidized to CO₂. This CO₂ is quantitatively collected in an evacuated vessel and measured by injection into a flame ionization detection/total combustion analysis (FID/TCA) system.</p> <p>The organic content of the sample fraction collected in each tank is measured by injecting a portion into the FID/TCA analysis system which uses a two phase gas chromatography (GC) column to separate carbon monoxide (CO), methane (CH₄) and carbon dioxide (CO₂) from each other and from the total gaseous non-methane organics (TGNMO) which are eluted as backflush. All eluted components are first oxidized to CO₂ by a hopcalite catalyst and then reduced to methane by a nickel catalyst. The resulting methane is detected using the flame ionization detector. A gas standard containing CO, CH₄, CO₂ and propane, traceable to NBS, is used to calibrated the FID/TCA analysis system.</p>

Method:

Determination of Total Gaseous Non-Methane Organic Emissions as Carbon

Reference:

SCAQMD Method 25.3

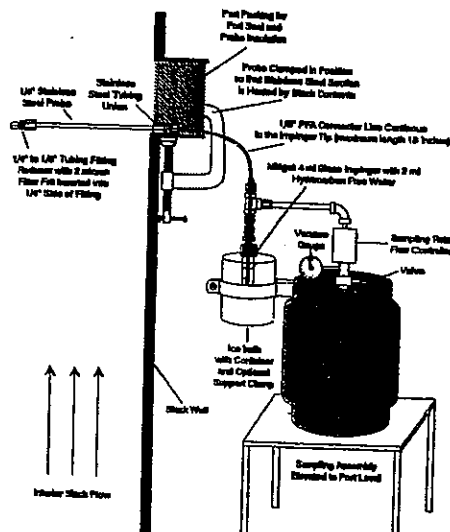
Principle:

A sample of flue gas is drawn through a condensate trap (mini-impinger) and into an evacuated six liter SUMMA canister. Volatile organic compounds (VOC), as total gaseous non-methane organics (TGNMO), are determined by combining results from independent analysis of condensate in the traps and gases in the SUMMA canisters.

Sampling Procedure:

Duplicate gas samples are withdrawn from a source at a constant rate through condensate traps immersed in an ice bath followed by evacuated six liter (nominal) SUMMA canisters. Heavy organic components condense as liquids and solids in the condensate traps. Lighter components pass as gases through the traps into the canisters. The combined results from canisters and mini-impinger analyses are used to determine a qualitative and quantitative expression of the effluent gas stream. Duplicate sampling is designed into the system to demonstrate precision.

The sampling apparatus is checked for leaks prior to the sampling program by capping the end of the sample probe. The sample flow valve is then opened and then closed to introduce vacuum to the system. The vacuum drop should then cease numerically above 10 in. Hg. A cease in movement of the vacuum gauge for a period of ten minutes indicates an acceptable leak check. When sampling is initiated, the vacuum gauge must indicate a canister vacuum of greater than 28 in. Hg. Immediately after sampling a post-test leak check is performed, followed by a rinse of the PFA line into the condensate trap with 0.5 to 1.0 ml of hydrocarbon free water.



Analytical Procedure:

Condensate traps are analyzed for total organic carbon by liquid injection into an infrared total organic carbon analyzer.

The organic content of the sample fraction collected in each canister is measured by injecting a portion into the FID/TCA analysis system which uses a two phase gas chromatography (GC) column to separate carbon monoxide (CO), methane (CH₄) and carbon dioxide (CO₂) from each other and from the total gaseous non-methane organics (TGNMO) which are eluted as backflush. All eluted components are first oxidized to CO₂ by a hopcalite catalyst and then reduced to methane by a nickel catalyst. The resulting methane is detected using the flame ionization detector. A gas standard containing CO, CH₄, CO₂ and propane, traceable to NBS, is used to calibrate the FID/TCA analysis system.

CONTINUOUS EMISSIONS MONITORING SYSTEM - TRUCK

SCAQMD Method 100.1

The continuous emissions monitoring system consists of a Thermo Electron Model 10AR chemiluminescence NO/NO_x analyzer, a Teledyne electro chemical O₂ analyzer, a Thermo Electron Model 48H CO gas filter correlation analyzer and a Horiba PIR 2000 non dispersive infrared CO₂ analyzer. All analyzer specifications are provided in Table 1. All concentrations are determined on a dry basis. Concentrations of NO_x, CO, O₂ and CO₂ are continuously recorded on a Linseis 10-inch strip chart recorder and a Strawberry Tree Data Acquisition System (DAS). The extractive monitoring system conforms with the requirements of SCAQMD Method 100.1.

The sampling probe (heated to 250°F), constructed of 1/2 inch-diameter 316 stainless steel, is connected to a condenser with a six foot length of 3/8 inch Teflon line (heated to 250°F). A Nupro stainless steel filter (10 micron) is connected at the tip of the probe and maintained at stack temperature.

The condenser consists of a series of two stainless steel moisture knock-out bottles immersed in an ice water bath. The system is designed to minimize contact between the sample and the condensate. Condensate is continuously removed from the knock-out bottles via a peristaltic pump. The condenser outlet temperature is monitored either manually at 10-minute intervals or on a strip chart recorder/DAS system. The sample exiting the condenser is then transported through a filter, housed in a stainless steel holder, followed by 3/8 inch O.D. Teflon tubing and a Teflon coated (or stainless steel/viton) diaphragm pump to the sample manifold. The sample manifold is constructed of stainless steel tubing and directs the sample through each of five rotameters to the NO_x monitor, O₂ monitor, CO monitor, CO₂ monitor and excess sample exhaust line, respectively. Sample flow through each channel is controlled by a back pressure regulator and by stainless steel needle valves on each rotameter. All components of the sampling system that contact the sample are composed of stainless steel, Teflon or glass.

The calibration system is comprised of two parts: the analyzer calibration and the system bias check. The calibration gases are, at a minimum, certified to $\pm 1\%$ by the manufacturer. Where necessary to comply with the reference method requirements, EPA Protocol 1 gases are used. The cylinders are equipped with pressure regulators which supply the calibration gas to the analyzers at the same pressure and flow rate as the sample. The selection of zero, span or sample gas directed to each analyzer is accomplished by operation of the zero, calibration or sample selector knobs located on the main flow control panel.

For SCAQMD Method 100.1 testing, the following procedures are conducted before and after each series of test runs:

Leak Check:

The leak check is performed by plugging the end of the sampling probe, evacuating the system to at least 20 inches of Hg. The leak check is deemed satisfactory if the system holds 20 inches of Hg vacuum for five minutes with less than one inch Hg loss.

Linearity Check:

The NO_x, CO, CO₂ and O₂ analyzers linearity check is performed by introducing, at a minimum, zero gas, mid range calibration gas (40-60% scale) and high range calibration gas (80-100% scale). Instrument span value is set on each instrument with the mid range gas. The high range calibration gas (80-100% scale) is then introduced into each instrument without any calibration adjustments. Linearity is confirmed, if all values agree with the calibration gas value to within 2% of the range.

Stratification Check:

A stack stratification check is performed (pre-test only) by traversing the stack with the appropriate number of traverse alternately with the reference point (center). If the gas composition is homogenous, < 10% variation between any traverse points in the gas stream and the normalized average point, single point gas sampling is performed at the reference point. If stratification exceeds the 10% criteria, then the stack cross section is traversed during sampling.

System Bias Check:

The system bias check is accomplished by transporting the same gases used to zero and span the analyzers to the sample system as close as practical to the probe inlet. This is accomplished by opening a valve located on the probe, allowing the gas to flow to the probe and back through the moisture knockout and sample line to the analyzers. During this check the system is operated at the normal sampling rate with no adjustments. The system bias check is considered valid if the difference between the gas concentration exhibited by the measurement system which a known concentration gas is introduced at the sampling probe tip and when the sample gas is introduced directly to the analyzer, does not exceed $\pm 5\%$ of the analyzer range.

Response Time:

Response time (upscale and downscale) for each analyzer is recorded during the system bias check. Upscale response time is defined as the time it takes the subject analyzer gas to reach 95% of the calibration gas value after introducing the upscale gas to the sample bias calibration system. Downscale response time is defined as the time it takes the subject analyzer to return to zero after the zero gas is introduced into the sample system bias calibration system.

NO_x Conversion Efficiency

The NO_x analyzer NO₂ conversion efficiency is determined by injecting a NO₂ gas standard directly into the NO_x analyzer (after initial calibration). The analyzer response must be at least 90% of the NO₂ standard gas value.

NO₂ Converter Efficiency (alternate method)

The mid level NO gas standard is directly injected into a clean leak-free Tedlar bag. The bag is then diluted 1:1 with air (20.9 % O₂). The bag is immediately attached to the NO_x sample line. The initial NO_x concentration is recorded on the strip chart. After at least 30 minutes the Tedlar bag is reattached to the NO_x sample line. Analyzer response must be at 98% of the initial Tedlar bag NO_x value to be acceptable.

In between each sampling run the following procedures are conducted:

Zero and Calibration Drift Check:

Upon the completion of each test run, the zero and calibration drift check is performed by introducing zero and mid range calibration gases to the instruments, with no adjustments (with the exception of flow to instruments) after each test run. The analyzer response must be within $\pm 3\%$ of the actual calibration gas value.

Analyzer Calibration:

Upon completion of the drift test, the analyzer calibration is performed by introducing the zero and mid range gases to each analyzer prior to the upcoming test run and adjusting the instrument calibration as necessary.

System Bias Check

(same as above)

A schematic of the sample system and specific information of the analytical equipment is provided in the following pages.

TABLE 1**CONTINUOUS EMISSIONS MONITORING LABORATORY - TRUCK****NO_x CHEMILUMINESCENT ANALYZER -- THERMO ELECTRON MODEL 10 A**

Response Time (0-90%)	1.5 sec -- NO mode/1.7 sec -- NO _x mode
Zero Drift	Negligible after 1/2 hour warmup
Linearity	$\pm 1\%$ of full scale
Accuracy	Derived from the NO or NO ₂ calibration gas, $\pm 1\%$ of full scale
Operating Ranges (ppm)	2.5, 10, 25, 100, 250, 1000, 2500, 10000
Output	0-1 volt

O₂ ANALYZER, FUEL TYPE -- TELEDYNE MODEL 326RA

Response Time (0-90%)	60 seconds
Accuracy	$\pm 1\%$ of scale at constant temperature $\pm 1\%$ of scale of $\pm 5\%$ of reading, whichever is greater, over the operation temperature range.
Operating Ranges (%)	0-5, 0-25
Output	0-1 volt

O₂ ANALYZER, PARAMAGNETIC -- SERVOMEX MODEL 1400B

Response Time (0-90%)	15 seconds
Accuracy	0.1% oxygen
Linearity	$\pm 1\%$ scale
Operating Ranges (%)	0-25, 0-100
Output	0-1 volt

CO GAS FILTER CORRELATION -- THERMO ELECTRON MODEL 48H

Response Time (0-95%)	1 minute
Zero Drift	± 0.2 ppm CO
Span Drift	Less than 1% full scale in 24 hours
Linearity	$\pm 1\%$ full scale, all ranges
Accuracy	± 0.1 ppm CO
Operating Ranges (ppm)	50, 100, 250, 500, 1000, 2500, 5000, 10,000, 25,000, 50,000
Output	0-1 volt

TABLE 1 (Cont.)

CO₂ INFRARED GAS ANALYZER -- HORIBA - MODEL PIR 2000

Response Time (0-90%)	5 seconds
Zero Drift	$\pm 1\%$ of full scale in 24 hours
Span Drift	$\pm 1\%$ of full scale in 24 hours
Linearity	$\pm 2\%$ of full scale
Resolution	Less than 1% of full scale
Operating Ranges (%)	0-5, 0-15, 0-25
Output	0-1 volt

SO₂ PULSED FLOURESCENT - TECO - MODEL 43C-HL

Response Time	80 seconds
Zero Drift	$\pm 1\%$
Span Drift	$\pm 1\%$
Linearity	$\pm 1\%$
Resolution	$\pm 1\%$
Operating Ranges	5, 10, 20, 50, 100, 200, 500, 1000, 2000, 5000
Output	0-10 volt

RATFISCH FID TOTAL HYDROCARBON ANALYZER -- MODEL 55CA

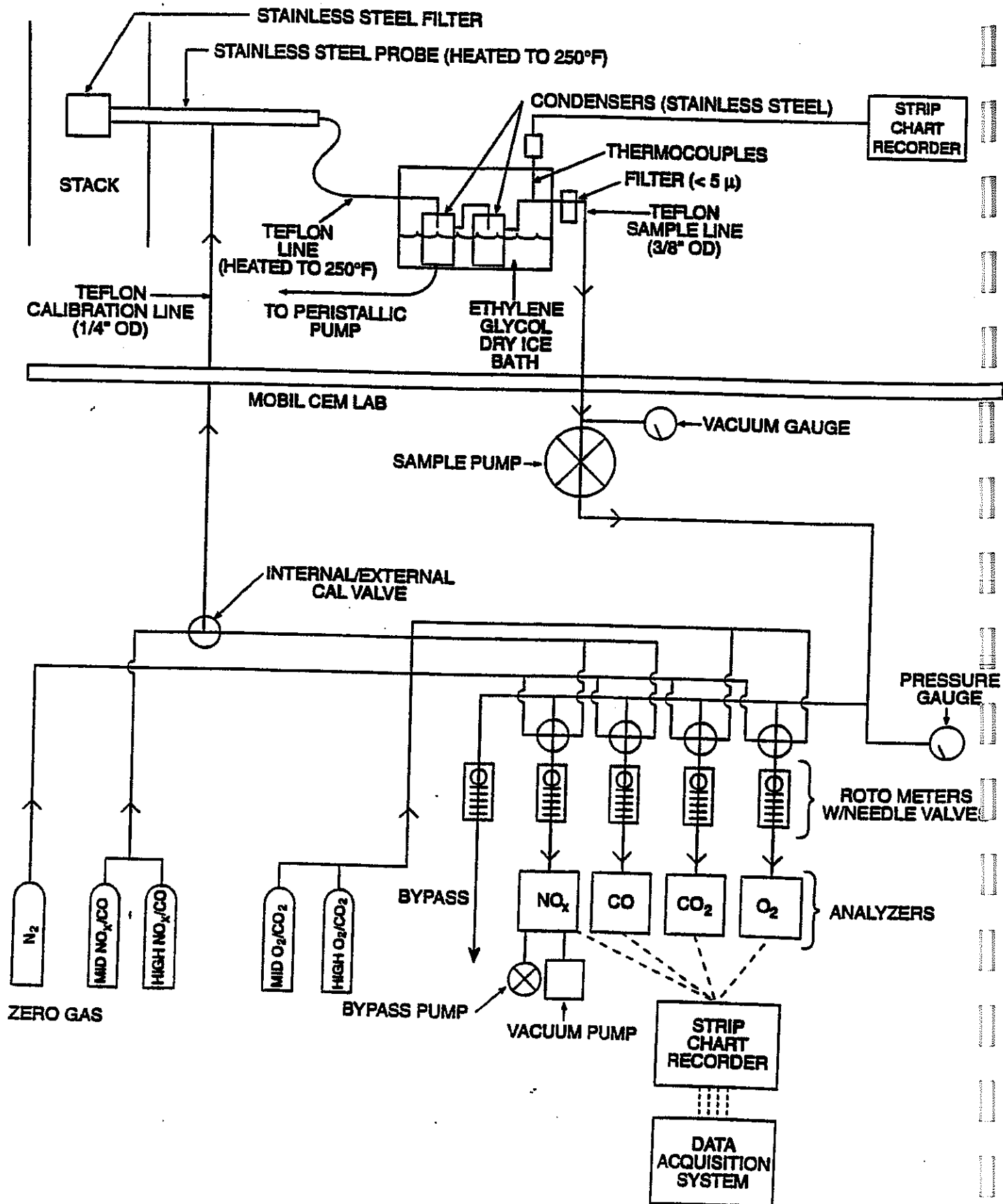
Response Time (0-90%)	5 seconds
Zero Drift	$\pm 1\%$ full scale in 24 hours
Span Drift	$\pm 1\%$ full scale in 24 hours
Linearity	$\pm 1\%$ full scale - constant
Accuracy	$\pm 1\%$ full scale at constant temp.
Operating Ranges (ppm)	10, 100, 1000, 10,000
Output	0 - 10 volts

LINSEIS MODEL L2045 FOUR PEN STRIP CHART RECORDER

Pen Speed	up to 120 cm/min
Measuring Response	0-20 volts
Linearity Error	0.25%
Accuracy	0.3%
Zero Suppression	Manual (from 1 to 10X full scale)

LINEAR 3 PEN CONTINUOUS -- MODEL 595 STRIP CHART

Pen Response	20 inches/second
Measuring Response	1 Mv through 5V
Zero Set	Electronically adjustable full scale with 1 full scale of zero suppression
Accuracy	Total limit of error $\pm 0.5\%$



Method:	NO/NO_x by Continuous Analyzer
Applicable Reference Methods:	EPA 7E, EPA 20; CARB 100, BAAQMD ST-13A, SCAQMD 100.1
Principle:	A sample is continuously withdrawn from the flue gas stream, conditioned and conveyed to the instrument for direct readout of NO or NO _x .
Analyzer:	TECO Model 10AR
Measurement Principle:	Chemiluminescence
Accuracy:	1 % of full scale
Ranges:	0-2.5, 0-10, 0-25, 0-100, 0-250, 0-1000, 0-2500, 0-10,000 ppm
Output:	0-10 V
Inferences:	Compounds containing nitrogen (other than ammonia) may cause interference.
Response Time:	90%, 1.5 seconds (NO mode) and 1.7 seconds (NO _x mode)
Sampling Procedure:	A representative flue gas sample is collected and conditioned using the CEM system described previously. If EPA Method 20 is used, that method's specific procedures for selecting sample points are used.
Analytical Procedure:	<p>The oxides of nitrogen monitoring instrument is a chemiluminescent nitric oxide analyzer. the operational basis of the instrument is the chemiluminescent reaction of NO and ozone (O₃) to form NO₂ in an excited state. Light emission results chemiluminescence is monitored through an optical filter by a high sensitivity photomultiplier tube, the output of which is electronically processed so it is linearly proportional to the NO concentration. The output of the instrument is in ppmV.</p> <p>When NO₂ is expected to be present in the flue gas, a supercooled water dropout flask will be placed in the sample line to avoid loss of NO₂. Since NO₂ is highly soluble in water, "freezing out" the water will allow the NO₂ to reach the analyzers for analysis. The analyzer measures NO only. In the NO_x mode, the gas is passed through a moly converter which converts NO₂ to NO and a total NO_x measurement is obtained. NO₂ is determined as the difference between NO and NO_x. Use of a moly converter instead of a stainless steel converter eliminates NH₃ interference; NH₃ is converted to NO with a stainless converter, but not with a moly converter.</p>

Method:	Oxygen (O₂) by Continuous Analyzer
Applicable Reference Methods:	EPA 3A, EPA 20, CARB 100, BAAQMD ST-14, SCAQMD 100.1
Principle:	A sample is continuously withdrawn from the flue gas stream, conditioned and conveyed to the instrument for direct readout of O ₂ concentration.
Analyzer:	Teledyne Model 326R
Measurement Principle:	Electrochemical cell
Ranges:	0-5, 0-25% 0-100%
Accuracy:	1% of full scale
Output:	0-1 V
Interferences:	Halogens and halogenated compounds will cause a positive interference. Acid gases will consume the fuel cell and cause a slow calibration drift.
Response Time:	90% < 60 seconds
Sampling Procedure:	A representative flue gas sample is collected and conditioned using the CEM system described previously. If Method 20 is used, that method's specific procedures for selecting sample points are used. Otherwise, stratification checks are performed at the start of a test program to select single or multiple-point sample locations.
Analytical Procedure:	An electrochemical cell is used to measure O ₂ concentration. Oxygen in the flue gas diffuses through a Teflon membrane and is reduced on the surface of the cathode. A corresponding oxidation occurs at the anode internally and an electric current is produced that is proportional to the concentration of oxygen. This current is measured and conditioned by the instrument's electronic circuitry to give an output in percent O ₂ by volume.

Method:	Carbon Dioxide (CO₂) by Continuous Analyzer
Applicable Reference	EPA 3A, CARB 100, BAAQMD ST-5, SCAQMD 100.1
Principle:	A sample is continuously drawn from the flue gas stream, conditioned and conveyed to the instrument for direct readout of CO ₂ concentration.
Analyzer:	PIR 2000
Measurement Principle:	Non-dispersive infrared (NDIR)
Accuracy:	1% of full scale
Ranges:	0-5, 0-15%
Output:	0-1 V
Interferences:	A possible interference includes water. Since the instrument receives dried sample gas, this interference is not significant.
Response Time:	5 seconds
Sampling Procedure:	A representative flue gas sample is collected and conditioned using the CEM system described previously.
Analytical Procedure:	Carbon dioxide concentrations are measured by short path length non-dispersive infrared analyzers. These instruments measure the differential in infrared energy absorbed from energy beams passed through a reference cell (containing a gas selected to have minimal absorption of infrared energy in the wavelength absorbed by the gas component of interest) and a sample cell through which the sample gas flows continuously. The differential absorption appears as a reading on a scale of 0-100%.

Method:	Carbon Monoxide (CO) by NDIR/Gas Filter Correlation
Applicable Reference Methods:	EPA 6C; CARB 1-100; BAAQMD ST-6, SCAQMD 100.1
Principle:	A sample is continuously drawn from the flue gas stream, conditioned and conveyed to the instrument for direct readout of CO concentration.
Analyzer:	TECO, Model 48H
Measurement Principle:	NDIR/Gas Filter Correlation
Precision:	0.1 % ppm
Ranges: ppm	0-50, 0-100, 0-250, 0-500, 0-1000, 0-2500, 0-5000, 0-10000, 0-2500, 0-3,000
Output:	0-1 V
Interferences:	Negligible interference from water and CO ₂
Rise/Fall times (0-95 %)	1 minute @ 1 lpm flow, 30 second integration time
Sampling Procedure:	A representative flue gas sample is collected and conditioned using the CEM system described previously. Sample point selection has been described previously.
Analytical Procedure:	Radiation from an infrared source is chopped and then passed through a gas filter which alternates between CO and N ₂ due to rotation of a filter wheel. The radiation then passes through a narrow band-pass filter and a multiple optical pass sample cell where absorption by the sample gas occurs. The IR radiation exits the sample cell and falls on a solid state IR detector.

Method:	Sulfur Dioxide (SO₂) by Pulsed Fluorescent
Applicable Reference Methods:	EPA 10; CARB 1-100; BAAQMD ST-6, SCAQMD 100.1
Principle:	A sample is continuously drawn from the flue gas stream, conditioned and conveyed to the instrument for direct readout of SO ₂ concentration.
Analyzer:	TECO, Model 43C-HL
Measurement Principle:	Pulsed fluorescence SO ₂ analyzer
Precision:	0.1 % ppm
Ranges:	5, 10, 20, 50, 100, 200 ppm
Output:	0-10 V
Interferences:	Less than lower detectable limit except for the following: NO < 3 ppb, m-xylene < 2 ppm, H ₂ O < 2% of reading.
Response Time:	80 seconds
Sampling Procedure:	A representative flue gas sample is collected and conditioned using the CEM system described previously. Sample point selection has been described previously.
Analytical Procedure:	The sample flows into the fluorescent chamber, where pulsating UV light excites the SO ₂ molecules. The condensing lens focuses the pulsating UV light into the mirror assembly. The mirror assembly contains four selecting mirrors that reflect only the wavelengths which excite SO ₂ molecules. As excited SO ₂ molecules decay to lower energy states they emit UV light that is proportional to the SO ₂ concentration. The PMT (photomultiplier tube) detects UV light emission from decaying SO ₂ molecules. The PMT continuously monitors pulsating UV light source and is connected to a circuit that compensates for fluctuating in the light.



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environmental consultants
laboratory services

Tandem Gas Chromatographic/Mass Spectroscopic-Electrolytic
Conductivity Detector (GC/MS-ELCD) Method for
Determination of Total Sulfur in Gas Samples

AtmAA, Inc.
03-060

3/30/93

This method measures selected reduced sulfur species, including but not limited to hydrogen sulfide, carbonyl sulfide, methyl mercaptan, ethyl mercaptan, dimethyl sulfide, carbon disulfide, isopropyl mercaptan, n-propyl mercaptan, and dimethyl disulfide in gaseous sample matrices using gas chromatographic separation and a mass spectrometric and electrolytic conductivity detector (ELCD), where the ELCD measures hydrogen sulfide only. A non-polar methyl silicon capillary gas chromatographic column is used for component separation and selected ion monitoring is used for component quantification. Component quantification is obtained using a multi-component external standard prepared by Scott Specialty Gases. The lower detection limit varies by component but is at least 0.1 ppmv ethyl mercaptan (component of lowest sensitivity) for a 0.31 ml sample volume injection. The upper quantitation limit has not been determined but is at least beyond 80 ppmv dimethyl disulfide, for which response remained linear from 0.1 ppmv to 80 ppmv.

Hydrogen sulfide is measured using an electrolytic conductivity detector operated in the oxidative sulfur mode. A Chromosil 310 column, operated isothermally at 45°C. is used to separate H₂S from other sulfur components. A fixed volume loop injection is used in the analysis for H₂S.

Lower Detection Limits (LDL's):

Using a 1 ml injection volume for H₂S by electrolytic conductivity detector and 0.40 ml injection volume for GC/MS measured sulfur compounds, the following LDL's are obtained:

	(ppmv)
Hydrogen sulfide	0.5
Carbonyl sulfide	0.03
Methyl mercaptan	0.03
Ethyl mercaptan	0.04
Dimethyl sulfide	0.02
Carbon disulfide	0.02
i-propyl mercaptan	0.03
n-propyl mercaptan	0.03
Dimethyl disulfide	0.02

Equipment:

A Hewlett-Packard 5890 series II gas chromatograph (GC), Hewlett-Packard 5971A Mass Selective Detector, 486 MS/DOS computer and HP operating software are used for all sulfur species except H_2S . The GC is fitted with a heated 6-port Valco 1/16" line, sample injection valve. All gas transfer lines to the sample loop are fused silica lined Restek tubing. The fixed volume (0.40 ml) sample loop is Teflon. The transfer line from the valve to the GC column is cleaned and treated blank 0.53 mm OD fused silica line with polyimide coating.

H_2S is measured using a Varian 1400 GC with the Hall oxidative quartz tube furnace and electrolytic cell attached. Nitrogen is used as carrier and oxygen is used as the combustion gas.

Multi-component gaseous standards are prepared by Scott Specialty Gas and are contained in two separate aluminum cylinders and a Scotty IV canister as follows:

Cylinder A (CAL12250)

Carbonyl sulfide	15.2 ppmv
Ethyl mercaptan	13.4 ppmv
Carbon disulfide	16.1 ppmv

Cylinder B (CAL3563)

Hydrogen sulfide	12.3 ppmv
Methyl mercaptan	22.6 ppmv
Dimethyl sulfide	20.3 ppmv
Dimethyl disulfide	

Scotty IV (mix 252)

Hydrogen Sulfide 93.8 ppmv

Gas tight clean glass volumetric syringes of 10, 20, & 50 ml capacity, with smooth glass barrel (not sintered glass) are used to make volumetric dilutions of sample or standard.

GC/MS SIM parameters:

	Dwell per ion	start time	Ions
Group 1:	75 msec.	8.0 min.	60
Group 2:	75 msec.	10.0 min.	47,48,64
Group 3:	75 msec.	14.5 min.	47,62,76,78,43,61
Group 4:	75 msec.	19.5 min.	79,94,122,142,156,128

Components monitored:

Group 1:	carbonyl sulfide
Group 2:	methyl mercaptan
Group 3:	ethyl mercaptan, dimethyl disulfide, carbon disulfide, isopropyl mercaptan, n-propyl mercaptan
Group 4:	dimethyl sulfide



Component	Quantitation ion	Confirmation ion
carbonyl sulfide	60	none
methyl mercaptan	47	48
ethyl mercaptan	62	47
dimethyl sulfide	62	47
carbon disulfide	76	78
iso-propyl mercaptan	76	43,47,61
n-propyl mercaptan	76	43,47,61
dimethyl disulfide	94	79

Sulfur dioxide is analyzed by monitoring mass 64 which is included in Group 2 ions.

Calibration:

Gaseous standards can be analyzed prior to or after a set of samples. Response factors are determined from a single point standard calibration. Multi-point calibrations are performed to verify linearity. Consistency of standard response with continuing calibrations is observed to indicate performance of multi-point calibration.

Samples containing components at less than the stated LDL can be analyzed by cryogenically focusing a measured volume of gaseous sample onto a glass bead filled Teflon loop immersed in liquid argon. The sample is thermally transferred upon injection by immersing the sample loop in near boiling temperature water. The LDL obtained by this technique is calculated as:

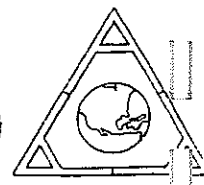
$$LDL_{cryo} = (\text{cryo volume}/0.40) * LDL_{0.40}$$

Acceptable volumes for cryogenic concentration range from 3 to 100 ml. and are determined based on amounts of other components in the sample such as water, carbon dioxide or hydrocarbons.

Procedure:

A volumetric sample of landfill or source collected gas is transferred from a Tedlar[®] bag to the 6-port valve injection line using a glass syringe of approximately 10 ml. A Teflon loop of 0.40 ml volume is used to inject the sample. When sample concentrations exceed that of the standard, appropriate volumetric sample dilutions are made using the glass syringes with dry nitrogen diluent. Immediately after sample injection, the GC/MS is started. Standards are analyzed in the same manner as samples. Appropriate component peaks are monitored and integrated after sample analysis data set has been obtained.

Hydrogen sulfide is measured using the electrolytic conductivity detector by a separate direct fixed loop valve injection using heated Teflon loop, transfer lines, and Teflon Chromosil 310 GC column.



A response factor for a standard component is calculated as:

$$rf = \text{std. amt.} / \text{std. area}$$

Sample concentration is calculated using the response factor:

$$\text{conc.} = rf \times \text{sample area}$$

At least 10% of samples in a sample set, or minimum of one sample per set are analyzed twice to determine precision. A separate report showing repeat analyses results is included with an analytical report of sulfur component concentrations per each sample set. Repeat analyses must agree within +/- 10% except for component concentrations less than 1 ppmv. A nitrogen blank is analyzed between standards and samples to verify that there is no component carry-over. Samples are analyzed as soon after they are received as possible, preferably same day and within four hours of collection. Data is being gathered to determine stability of sulfur compounds in Tedlar[®] bag containers in an effort to extend sample holding time. Samples are usually analyzed before standards to prevent carry-over, since most sulfur components measured in landfill gas samples are lower in concentration than those in the standards.

GC/MS Analysis Conditions:

GC conditions: a 30 M x 0.2 mm, 0.50 um film methyl silicon PONA column from Hewlett-Packard is temperature programmed as follows:

-65 degrees C, hold min.

15 degrees C min. to 220 degrees C, hold 5 min.

Valve oven Temp. 150 degrees C

GC/MS transfer line 180 degrees C

Carrier gas is helium, pressure regulated at 21 psi.

MS Conditions:

MS calibration is performed periodically prior to performing analyses using PFTBA (perfluoro-tributylamine) as supplied by Hewlett-Packard and as controlled by HP software under the mid-range auto tune program.

Solvent delay = 8 min.

Hall Detector/GC Analysis Conditions:

6' x 1/8" Teflon, Chromosil 310 analytical column

45 degrees C, isothermal

Valve oven & transfer line Temp. 105 degrees C.

Carrier gas is nitrogen, flow rate 18 cc/min.

Oxygen oxidation gas, flow rate 18 cc/min.

Quartz tube oxidation oven Temp. 650 degrees C.



APPENDIX B - Computer Printout of Results

SCAQMD Method 25.1 Analysis

Facility: Bradley Landfill
Source: Flare #1
Job No.: W07-039
Date: 4/20/2004

TOTAL COMBUSTION ANALYSIS RESULTS

Sample ID Run Number	Inlet 1A	Inlet 1B	Average
Methane in Tank	412000	423000	417500
TNMHC, Tank (Noncond.)	1040	1240	
TNMHC - Condensables	11049.3	10724.4	
TNMHC - Total	12089.3	11964.4	
CO Concentration (ppm)	53.1	52.1	52.6
CO2 Concentration (ppm)	360000	363000	361500
O2 Concentration (%)	1.76	1.42	1.59
Sample Parameters			
Tank Number	C	I	
Trap Number	U	Y1	
Sample Tank Volume (l)	12.202	12.051	
Initial Pressure (Torr)	2.5	2.5	
Initial Temperature (deg. K)	292	292	
Final Pressure (mm Hg)	542	560	
Final Temperature (deg. K)	292	292	
Sample Volume (l)	8.70	8.87	
Analysis Pressure (mm Hg)	820	820	
Analysis Temperature (deg. K)	292	292	
ICV Volume (l)	2.266	2.266	
ICV Final Pressure (mm Hg)	800	800	
ICV Final Temperature (deg. K)	292	292	
CO2 in ICV (ppm)	42400	42000	
TNMHC, Trap (Condensables)	11049	10724	
Stack Total TNMHC	12089	11964	12027

NOTE: All hydrocarbon values are in terms of ppm, v/v, as methane.

SCAQMD Methods 1-4 Flowrate Determination

Facility: Bradley Landfill
Source: Flare #1
Job No.: W07-039
Date: 4/20/04

STANDARD TEMPERATURE	Degrees F	60		
RUN NUMBER	*****	1	2	Average
CLOCK TIME: INITIAL	*****	1600	1751	
CLOCK TIME: FINAL	*****	1700	1851	
AVG. STACK TEMPERATURE	Degrees F	165	158	162
AVG. SQUARE DELTA P	Inches H2O	1.1650	1.2138	1.1894
BAROMETRIC PRESSURE	Inches HG	29.23	29.23	29.23
SAMPLING TIME	Minutes	60	60	60
SAMPLE VOLUME	Cubic Feet	44.815	51.727	48.271
AVG. METER TEMP.	Degrees F	85.0	83.4	84.2
AVG. DELTA H	Inches H2O	1.50	1.50	1.50
DGM CALIB. FACTOR [Y]	*****	1.0076	1.0076	1.0076
WATER COLLECTED	Milliliters	61	82	72
CO 2	Percent	36.2	36.2	36.2
O 2	Percent	1.6	1.6	1.6
CO	Percent			
CH4	Percent	41.8	41.8	41.8
N 2	Percent	20.5	20.5	20.5
STACK AREA	Square Inches	137.9	137.9	137.9
STATIC PRESSURE	Inches WG	6.50	4.70	5.60
PITOT COEFFICIENT	*****	0.99	0.99	0.99
SAMPLE VOLUME DRY	DSCF	42.25	48.91	45.58
WATER AT STD.	SCF	2.9	3.9	3.4
MOISTURE	Percent	6.4	7.3	6.8
MOLE FRACTION DRY GAS	*****	0.94	0.93	0.93
MOLECULAR WT.DRY	lb/lb Mole	28.84	28.84	28.84
EXCESS AIR	Percent	42	42	42
MOLECULAR WT. WET	lb/lb Mole	28.15	28.04	28.10
STACK GAS PRESSURE	Inches HG	29.71	29.58	29.64
STACK VELOCITY	AFPM	5115	5321	5218
VOLUMETRIC FLOWRATE, DRY STD.	DSCFM	3789	3928	3858
VOLUMETRIC FLOWRATE, ACTUAL	ACFM	4899	5096	4997
EMISSION RATES				
SAMPLE A				
TNMHC Concentration, as CH4	ppm	12089		12089
TNMHC Concentration, as CH4	mg/dscf	231		231
TNMHC Emission Rate, as CH4	lb/hr	115.8		117.9
SAMPLE B				
TNMHC Concentration, as CH4	ppm	11964		11964
TNMHC Concentration, as CH4	mg/dscf	229		229
TNMHC Emission Rate, as CH4	lb/hr	114.6		116.7
AVERAGE				
TNMHC Concentration, as CH4	ppm	12027		12027
TNMHC Concentration, as CH4	mg/dscf	230		230
TNMHC Emission Rate, as CH4	lb/hr	115.2		117.3

EXPANSION AND F-FACTOR CALC. METHOD

Client: Bradley Landfill
 Location: Sun Valley, CA
 Unit: Flare #1

Date: 4/20/2004
 Job #: W07-039
 Run#: 1

Fuel temperature _____ deg. F
 Fuel Pressure _____ psi
 Fuel Flow Rate _____ cfm
 Exhaust Outlet O2 12.97 %
 Barometric Pressure 29.23

Std. Temp. 60 deg. F
 Fuel Flow 3789 dscfm

COMPONENTS	MOLE %	HHV btu/ft3	LLV btu/ft3	Exp Factor dscf/scf fuel
Oxygen	<u>1.59</u>			0.016
Nitrogen	<u>20.51</u>			0.205
Carbon Dioxide	<u>36.15</u>			0.362
Methane	<u>41.75</u>	421.68	379.67	3.578
Ethane C2		0.00	0.00	0.000
Propane C3		0.00	0.00	0.000
Iso-Butane C4		0.00	0.00	0.000
N-Butane		0.00	0.00	0.000
Iso-Pentane C5		0.00	0.00	0.000
N-Pentane		0.00	0.00	0.000
Hexane C6		0.00	0.00	0.000
Heptane C7		0.00	0.00	0.000
Octane C8		0.00	0.00	0.000
Nonane C9		0.00	0.00	0.000
Total	100.00	421.68	379.67	4.16

CALCULATIONS

EXHAUST FLOW RATE, Q = (scfm*Exp Fac)*(20.92/(20.92-%O2))

41474 DSCFM

EPA F-Factor = (scf exhaust/scf fuel)/(btu/scf fuel)*(1000000 btu/MMbtu)

9867 dscf/Mmbtu

EXPANSION AND F-FACTOR CALC. METHOD

Client: Bradley Landfill
 Location: Sun Valley, CA
 Unit: Flare #1

Date: 4/20/04
 Job #: W07-039
 Run#: 2

Fuel temperature _____ deg. F
 Fuel Pressure _____ psi
 Fuel Flow Rate _____ cfm
 Exhaust Outlet O2 12.94 %
 Barometric Pressure 29.23
 Std. Temp. 60 deg. F
 Fuel Flow 3928 dscfm

COMPONENTS		MOLE %	HHV btu/ft3	LLV btu/ft3	Exp Factor dscf/scf fuel
Oxygen		<u>1.59</u>			0.016
Nitrogen		<u>20.51</u>			0.205
Carbon Dioxide		<u>36.15</u>			0.362
Methane		<u>41.75</u>	421.68	379.67	3.578
Ethane	C2		0.00	0.00	0.000
Propane	C3		0.00	0.00	0.000
Iso-Butane	C4		0.00	0.00	0.000
N-Butane			0.00	0.00	0.000
Iso-Pentane	C5		0.00	0.00	0.000
N-Pentane			0.00	0.00	0.000
Hexane	C6		0.00	0.00	0.000
Heptane	C7		0.00	0.00	0.000
Octane	C8		0.00	0.00	0.000
Nonane	C9		0.00	0.00	0.000
Total		100.00	421.68	379.67	4.16

CALCULATIONS

EXHAUST FLOW RATE, Q = (scfm*Exp Fac)*(20.92/(20.92-%O2))

42817 DSCFM

EPA F-Factor = (scf exhaust/scf fuel)/(btu/scf fuel)*(1000000 btu/MMbtu)

9867 dscf/MMbtu

SCAQMD Method 307.91

Facility: Bradley Landfill
 Source: Flare #1
 Job No.: W07-039
 Date: 4/20/04

Sulfur Compounds

Speciated Compound	Concentration ppm, as H ₂ S	No. of S molecules in Compound	Total S ppm, as H ₂ S	SO ₂ Conc. mg/dscf	Avg. Inlet Flow Rate dscfm	SO ₂ Rate lb/hr
Hydrogen Sulfide	68.1	1	68.10	5.215	3858	2.661
Carbonyl Sulfide	0.39	1	0.39	0.030	3858	0.015
Methyl mercaptan	2.58	1	2.58	0.198	3858	0.101
Ethyl mercaptan	< 0.09	1	0.09	0.007	3858	0.004
Dimethyl sulfide	6.26	1	6.26	0.479	3858	0.245
Carbon disulfide	0.10	2	0.20	0.015	3858	0.008
Dimethyl disulfide	0.220	2	0.44	0.034	3858	0.017
iso-propyl mercaptan	0.32	1	0.32	0.025	3858	0.013
n-propyl mercaptan	< 0.06	1	0.06	0.005	3858	0.002
Total			78.44			3.07

Facility: Bradley Landfill
Source: Flare #1
Job No.: W07-039
Date: 4/20/04

STANDARD TEMPERATURE	Degrees F	60				
RUN NUMBER	*****	1	2	1	2	
DATE OF RUN	*****	04/20/04	04/23/03	04/20/04	04/23/03	
CLOCK TIME: INITIAL	*****	1600	1751	1600	1751	
CLOCK TIME: FINAL	*****	1706	1857	1706	1857	
AVG. STACK TEMPERATURE	Degrees F	1527	1520			
AVG. SQUARE DELTA P	Inches H2O	0.1000	0.1000			
NOZZLE DIAMETER	Inches	1.090	1.090			
BAROMETRIC PRESSURE	Inches HG	29.23	29.23			
SAMPLING TIME	Minutes	60	60			
SAMPLE VOLUME	Cubic Feet	62.802	64.310			
AVG. METER TEMP.	Degrees F	72.0	67.5			
AVG. DELTA H	Inches H2O	3.60	3.60			
DGM CALIB. FACTOR [Y]	*****	1.0055	1.0055			
WATER COLLECTED	Milliliters	134	115			
CO 2	Percent	6.92	6.99			
O 2	Percent	12.97	12.94			
CO	Percent					
CH4	Percent					
N 2	Percent	80.11	80.08			
STACK AREA	Square Inches	16286.0	16286.0			
STATIC PRESSURE	Inches WG.	-0.010	-0.010			
PITOT COEFFICIENT	*****	0.84	0.84			
SAMPLE VOLUME DRY	DSCF	60.85	62.84			
WATER AT STD.	SCF	6.3	5.4			
MOISTURE	Percent	9.4	7.9			
MOLE FRACTION DRY GAS	*****	0.91	0.92			
MOLECULAR WT. DRY	lb/lb Mole	29.63	29.64			
EXCESS AIR	Percent	159	158			
MOLECULAR WT. WET	lb/lb Mole	28.53	28.71			
STACK GAS PRESSURE	Inches HG	29.23	29.23			
STACK VELOCITY	AFPM	665	662			
VOLUMETRIC FLOWRATE, DRY STD.	DSCFM	17421	17680	41474	*	42817 *
VOLUMETRIC FLOWRATE, ACTUAL	ACFM	75234	74861			
ISOKINETIC RATIO	Percent	100	102			

CALCULATIONS FOR GRAIN LOADING AND EMISSION RATES

TOTAL PARTICULATE	mg	22.5	15.0	22.5	15.0
PARTICULATE CONCENTRATION	gr/dscf	0.0057	0.0037	0.0057	0.0037
PARTICULATE EMISSION RATE	lb/hr	0.85	0.56	2.02	1.35

*Denotes the use of calculated flowrate based on expansion factor of LFG.

SCAQMD Method 100.1 Emission Rates

Facility: Bradley Landfill
 Source: Flare #1
 Job No.: W07-039
 Date: 4/20/04

Run Number	*****	1	2
Load	*****	as Found	as Found
EPA F-Factor	dscf/MMBtu	9867	9867
Stack Flow Rate	dscfm	41474	42817
Oxygen	%	12.97	12.94
Carbon Dioxide	%	6.92	6.99

Oxides of Nitrogen

Concentration	ppm	10.3	7.0
Concentration @ 3 % O ₂	ppm	23.3	15.7
Concentration	lb/dscf	1.25E-06	8.46E-07
Emission Rate	lb/MMBtu	3.26E-02	2.19E-02
Emission Rate	lb/hr	3.116	2.174

Carbon Monoxide*

Concentration	ppm	119	116
Concentration @ 3 % O ₂	ppm	269	261
Concentration	lb/dscf	8.78E-06	8.56E-06
Emission Rate	lb/MMBtu	2.28E-01	2.22E-01
Emission Rate	lb/hr	21.8	22.0

* Carbon monoxide concentration determined from analysis of Tedlar bag samples

Client: Waste Management
 Job No.: W07-039
 Site: Bradley Landfill
 Unit: Flare #1

Date: 04/20/04
 Run #: 1
 Fuel: L.F.G.
 Std. O2: 3

	O2 %	CO2 %	NOx ppm	CO ppm
Range:	25.00	20.00	25.00	100.00
Span:	11.98	7.00	9.93	50.20
Low:				
High:	20.90	11.98	20.40	80.20

**** POST-TEST DRIFT ****

Values				
Zero:	-0.12	0.00	-0.13	0.00
Span:	12.00	7.00	9.89	50.10

Percent Drift

Zero:	-0.48	0.00	-0.52	0.00
Span:	0.08	0.00	-0.16	-0.10

**** PRE-TEST BIAS ****

Values				
Zero:	0.13	0.00	0.12	0.00
Span:	11.98	6.95	9.50	50.00

**** POST-TEST BIAS ****

Values				
Zero:	0.12	0.00	-0.20	-0.50
Span:	12.10	6.80	9.85	49.40

**** BIAS CORRECTION ****

Zero Average	0.13	0.00	-0.04	-0.25
Span Average	12.04	6.88	9.68	49.70

Bias-Corrected Concentration

	12.97	6.92	10.33	58.15
Bias-Corrected Conc.(O2 adjusted)			23.32	131.24

**** RAW AVERAGE CONCENTRATION ****

Average:		13.02	6.80	10.07	57.61
O2 adjust:				22.88	130.93
Date	Time	O2	CO2	NOx	CO
20-Apr-04					
20-Apr-04	1600	12.77	6.98	11.35	11.93
20-Apr-04	1601	13.10	6.59	9.43	67.61
20-Apr-04	1602	13.27	6.44	8.40	100.28
20-Apr-04	1603	13.36	6.57	9.15	100.28
20-Apr-04	1604	13.10	6.73	9.78	92.18
20-Apr-04	1605	13.19	6.63	9.45	81.87

20-Apr-04	1606	13.04	6.85	11.16	71.54
20-Apr-04	1607	13.04	6.71	10.66	29.57
20-Apr-04	1608	12.93	7.00	11.78	30.12
20-Apr-04	1609	12.99	6.72	10.26	26.55
20-Apr-04	1610	13.28	6.43	7.94	95.61
20-Apr-04	1611	13.08	6.93	9.50	98.84
20-Apr-04	1612	13.02	6.72	9.37	95.69
20-Apr-04	1613	12.99	6.87	10.82	60.66
20-Apr-04	1614	13.00	6.82	10.44	39.46
20-Apr-04	1615	12.97	6.84	10.71	36.48
20-Apr-04	1616	12.92	6.99	11.38	36.09
20-Apr-04	1617	12.88	6.91	10.89	16.46
20-Apr-04	1618	13.04	6.64	9.61	36.66
20-Apr-04	1619	13.21	6.68	9.51	93.44
20-Apr-04	1620	13.18	6.66	9.24	88.11
20-Apr-04	1621	13.04	6.80	9.64	52.24
20-Apr-04	1622	13.27	6.41	8.43	79.12
20-Apr-04	1623	13.43	6.50	8.64	100.28
20-Apr-04	1624	13.18	6.66	10.22	95.19
20-Apr-04	1625	13.07	6.81	11.01	61.13
20-Apr-04	1626	12.82	7.08	11.62	17.33
20-Apr-04	1627	12.76	7.00	11.02	6.78
20-Apr-04	1628	12.60	7.28	11.38	6.77
20-Apr-04	1629	12.84	6.86	11.03	10.34
20-Apr-04					Port change
20-Apr-04	1634	13.15	6.74	10.20	37.61
20-Apr-04	1635	13.07	6.73	10.49	38.89
20-Apr-04	1636	13.13	6.71	10.23	46.54
20-Apr-04	1637	13.08	6.82	10.58	34.00
20-Apr-04	1638	12.83	7.02	11.08	11.91
20-Apr-04	1639	13.00	6.73	10.26	20.36
20-Apr-04	1640	13.15	6.69	9.35	82.29
20-Apr-04	1641	13.11	6.70	8.87	87.64
20-Apr-04	1642	13.19	6.65	8.73	100.29
20-Apr-04	1643	13.09	6.77	9.52	100.28
20-Apr-04	1644	12.75	7.19	11.02	50.64
20-Apr-04	1645	12.79	6.93	10.71	29.34
20-Apr-04	1646	12.79	7.06	11.21	27.97
20-Apr-04	1647	12.77	7.06	11.27	15.69
20-Apr-04	1648	12.67	7.13	10.84	8.98
20-Apr-04	1649	12.98	6.74	9.50	66.99
20-Apr-04	1650	13.10	6.65	9.40	77.05
20-Apr-04	1651	13.17	6.76	9.37	94.40
20-Apr-04	1652	13.19	6.55	8.69	89.08
20-Apr-04	1653	13.20	6.66	9.54	100.28
20-Apr-04	1654	13.09	6.84	10.38	90.43
20-Apr-04	1655	12.67	7.17	11.31	14.15
20-Apr-04	1656	12.80	6.94	10.80	13.32
20-Apr-04	1657	13.09	6.67	9.99	30.78
20-Apr-04	1658	13.10	6.71	9.72	49.26

20-Apr-04	1659	13.16	6.67	8.77	100.29
20-Apr-04	1700	13.16	6.70	8.97	100.28
20-Apr-04	1701	13.11	6.64	8.75	100.29
20-Apr-04	1702	13.24	6.67	8.74	100.29
20-Apr-04	1703	13.01	6.87	10.51	95.43
20-Apr-04	1704	12.63	7.25	12.13	14.99
20-Apr-04	1705	12.78	6.87	11.20	5.81
20-Apr-04	1706	12.96	6.89	10.07	29.13
20-Apr-04	1707	13.13	6.58	8.36	83.94

Client: Waste Management
 Job No.: W07-039
 Site: Bradley Landfill
 Unit: Flare #1

Date: 04/20/04
 Run #: 2
 Fuel: L.F.G.
 Std. O2: 3

	O2 %	CO2 %	NOx ppm	CO ppm
Range:	25.00	20.00	25.00	100.00
Span:	11.98	7.00	9.93	50.20
Low:				
High:	20.90	11.98	20.40	80.20

**** POST-TEST DRIFT ****

Values				
Zero:	-0.12	0.00	-0.13	0.00
Span:	12.00	7.00	9.89	50.10

Percent Drift

Zero:	-0.48	0.00	-0.52	0.00
Span:	0.08	0.00	-0.16	-0.10

**** PRE-TEST BIAS ****

Values				
Zero:	0.13	0.00	0.12	0.00
Span:	11.98	6.95	9.50	50.00

**** POST-TEST BIAS ****

Values				
Zero:	0.12	0.00	-0.20	-0.40
Span:	12.05	6.80	9.70	49.50

**** BIAS CORRECTION ****

Zero Average	0.13	0.00	-0.04	-0.20
Span Average	12.02	6.88	9.60	49.75

Bias-Corrected Concentration
Bias-Corrected Conc.(O2 adjusted)

12.94	6.99	6.98	31.93
		15.69	71.76

**** RAW AVERAGE CONCENTRATION ****

Average:					
O2 adjust:					
Date	Time	O2	CO2	NOx	CO
		12.96	6.86	6.74	31.57
				15.20	71.20
		3.0			
20-Apr-04	1751	12.77	7.00	6.83	80.80
20-Apr-04	1752	12.84	7.00	6.84	35.70
20-Apr-04	1753	12.86	6.85	6.49	37.89
20-Apr-04	1754	12.86	7.02	6.95	39.17
20-Apr-04	1755	12.93	6.92	6.74	22.51
20-Apr-04	1756	12.94	6.88	6.57	54.89

20-Apr-04	1757	12.80	7.01	6.97	21.80
20-Apr-04	1758	12.77	7.00	7.00	11.05
20-Apr-04	1759	13.02	6.87	6.62	43.13
20-Apr-04	1800	12.91	6.78	6.50	45.34
20-Apr-04	1801	12.99	6.94	6.73	47.61
20-Apr-04	1802	12.89	6.91	6.81	25.69
20-Apr-04	1803	12.71	7.14	7.16	19.37
20-Apr-04	1804	12.92	6.72	6.50	18.78
20-Apr-04	1805	13.10	6.82	6.66	45.66
20-Apr-04	1806	13.14	6.64	6.37	50.24
20-Apr-04	1807	13.13	6.72	6.59	32.40
20-Apr-04	1808	13.05	6.83	6.67	23.02
20-Apr-04	1809	12.99	6.85	6.76	14.68
20-Apr-04	1810	12.97	6.83	6.58	18.47
20-Apr-04	1811	13.13	6.71	6.28	46.60
20-Apr-04	1812	13.09	6.73	6.35	58.20
20-Apr-04	1813	13.20	6.62	6.18	84.20
20-Apr-04	1814	12.82	7.13	7.41	28.55
20-Apr-04	1815	12.81	6.98	7.19	4.96
20-Apr-04	1816	12.79	7.03	7.25	2.39
20-Apr-04	1817	13.00	6.75	6.45	11.79
20-Apr-04	1818	13.07	6.77	6.23	60.01
20-Apr-04	1819	13.09	6.77	6.28	69.66
20-Apr-04	1820	13.03	6.79	6.43	41.06
20-Apr-04					Port change
20-Apr-04	1827	12.98	6.85	6.44	87.60
20-Apr-04	1828	13.05	6.70	6.27	44.79
20-Apr-04	1829	13.02	6.91	6.85	63.00
20-Apr-04	1830	12.82	7.05	7.26	32.37
20-Apr-04	1831	12.61	7.20	7.56	7.28
20-Apr-04	1832	12.88	6.85	6.89	8.05
20-Apr-04	1833	12.80	7.01	7.15	9.18
20-Apr-04	1834	13.14	6.59	6.21	50.52
20-Apr-04	1835	13.07	6.84	6.74	45.26
20-Apr-04	1836	13.03	6.79	6.64	17.14
20-Apr-04	1837	13.04	6.79	6.65	18.54
20-Apr-04	1838	13.00	6.77	6.59	17.04
20-Apr-04	1839	13.20	6.69	6.46	48.26
20-Apr-04	1840	13.09	6.77	6.69	31.51
20-Apr-04	1841	13.08	6.73	6.54	33.62
20-Apr-04	1842	13.03	6.81	6.76	18.14
20-Apr-04	1843	12.96	6.85	6.92	8.52
20-Apr-04	1844	12.95	6.86	6.90	5.93
20-Apr-04	1845	12.88	7.04	7.15	10.98
20-Apr-04	1846	12.87	6.86	6.85	4.81
20-Apr-04	1847	13.08	6.75	6.47	29.21
20-Apr-04	1848	13.09	6.76	6.32	76.24
20-Apr-04	1849	13.06	6.76	6.38	74.77
20-Apr-04	1850	13.00	6.82	6.55	42.52
20-Apr-04	1851	12.87	7.08	7.20	34.92

20-Apr-04	1852	12.82	6.91	6.98	5.92
20-Apr-04	1853	12.91	6.98	7.07	8.14
20-Apr-04	1854	12.78	6.94	7.00	5.57
20-Apr-04	1855	13.03	6.81	6.78	9.97
20-Apr-04	1856	12.96	6.96	7.12	9.24
20-Apr-04	1857	12.94	6.85	6.98	4.81
20-Apr-04	1858	12.94	6.84	6.95	5.44
20-Apr-04	1859	13.06	6.79	6.75	24.06

PRETEST		CALIBRATION ERROR			
LEAK CHECK					
RANGE :		25	20	100	25
		O2	CO2	CO	NOx
ZERO					
Instrument		0.00	0.00	0.00	0.00
Cylinder		0.00	0.00	0.00	0.00
Difference (%)		0.00	0.00	0.00	0.00
LOW LEVEL					
Instrument					
Cylinder					
Difference (%)		0.00	0.00	0.00	0.00
MID LEVEL					
Instrument		12.13	7.00	49.80	9.88
Cylinder		11.98	7.00	50.20	9.93
Difference (%)		0.58	0.00	-0.40	-0.20
HIGH LEVEL					
Instrument		21.13	11.90	80.00	20.13
Cylinder		20.90	11.98	80.20	20.40
Difference (%)		0.90	-0.40	-0.20	-1.10

PRETEST		LINEARITY	
		Cylinder	Instrument
		O2	
Zero		0.00	0.00
High Level		20.90	21.13
Slope		0.99	
Intercept		0.00	Status
Predicted Value		12.11	<1
Linearity (%)		0.06	PASS
		CO2	
Zero		0.00	0.00
High Level		11.98	11.90
Slope		1.01	
Intercept		0.00	Status
Predicted Value		6.95	<1
Linearity (%)		0.23	PASS
		CO	
Zero		0.00	0.00
High Level		80.20	80.00
Slope		1.00	
Intercept		0.00	Status
Predicted Value		50.07	<1
Linearity (%)		0.27	PASS
		NOX	
Zero		0.00	0.00
High Level		20.40	20.13
Slope		1.01	
Intercept		0.00	Status
Predicted Value		9.80	<1
Linearity (%)		0.34	PASS

POST TEST		CALIBRATION ERROR			
LEAK CHECK					
		O2	CO2	CO	NOx
ZERO					
Instrument		-0.25	0.00	0.00	0.00
Cylinder		0.00	0.00	0.00	0.00
Difference (%)		-1.00	0.00	0.00	0.00
LOW LEVEL					
Instrument					
Cylinder					
Difference (%)		0.00	0.00	0.00	0.00
MID LEVEL					
Instrument		12.00	7.00	50.00	9.98
Cylinder		11.98	7.00	50.20	9.93
Difference (%)		0.08	0.00	-0.20	0.20
HIGH LEVEL					
Instrument		21.25	12.00	80.50	21.00
Cylinder		20.90	11.98	80.20	20.40
Difference (%)		1.40	0.10	0.30	2.40

POST TEST		LINEARITY	
		Cylinder	Instrument
		O2	
Zero		0.00	-0.25
High Level		20.90	21.25
Slope		0.97	
Intercept		0.24	Status
Predicted Value		12.07	<1
Linearity (%)		0.30	PASS
		CO2	
Zero		0.00	0.00
High Level		11.98	12.00
Slope		1.00	
Intercept		0.00	Status
Predicted Value		7.01	<1
Linearity (%)		0.06	PASS
		CO	
Zero		0.00	0.00
High Level		80.20	80.50
Slope		1.00	
Intercept		0.00	Status
Predicted Value		50.39	<1
Linearity (%)		0.39	PASS
		NOX	
Zero		0.00	0.00
High Level		20.40	21.00
Slope		0.97	
Intercept		0.00	Status
Predicted Value		10.22	<1
Linearity (%)		0.97	PASS

Facility: Waste Management
Source: Flare #1
Job No.: W07-D39
Test Date: 4/20/04

Method 100.1 Performance Data

SYSTEM RESPONSE TIME			
	#1	#2	#3
Upscale			
NOx	22		
CO	55		
O2	31		
CO2	20		
Downscale			
NOx	23		
CO	50		
O2	28		
CO2	20		

NO2 CONVERTER EFFICIENCY			
	ppm	%	status
Cylinder(Co)	18.90		
NO Mode(C1)	1.50		
NOx Mode(C2)	17.50		
D1	17.40		
D2	16.00		
D3	1.40		
CE		91.95	
CE > 90 %			PASS

Table 5-2
Trace Organic Species
Destruction Efficiency Results
Waste Management - Bradley Landfill
Flare #1
April 20, 2004

Species	INLET			OUTLET			
	Flow rate	3858	dscfm	Flow rate	42145.8	dscfm	
Species	Conc. (ppb)	Conc. (mg/dscf)	Em. Rate (lb/hr)	Conc. (ppb)	Conc. (mg/dscf)	Em. Rate (lb/hr)	Dest. Eff. (%)
Hydrogen Sulfide	68100	2.78E+00	1.42E+00	< 500	< 2.04E-02	< 1.14E-01	> 91.98
Benzene	2720	2.54E-01	1.29E-01	< 0.2	< 1.86E-05	< 1.04E-04	> 99.92
Benzylchloride	< 40	< 6.07E-03	< 3.10E-03	< 0.8	< 1.21E-04	< 6.77E-04	NA
Chlorobenzene	152	2.05E-02	1.05E-02	< 0.2	< 2.70E-05	< 1.51E-04	> 98.56
Dichlorobenzenes	2120	3.72E-01	1.90E-01	< 1.1	< 1.93E-04	< 1.08E-03	> 99.43
1,1-dichloroethane	459	5.43E-02	2.77E-02	< 0.2	< 2.37E-05	< 1.32E-04	> 99.52
1,2-dichloroethane	95.6	1.13E-02	5.77E-03	< 0.2	< 2.37E-05	< 1.32E-04	> 97.71
1,1-dichloroethylene	64.9	7.52E-03	3.84E-03	< 0.2	< 2.32E-05	< 1.29E-04	> 96.63
Dichloromethane	1840	1.87E-01	9.54E-02	1.04	1.06E-04	5.89E-04	99.38
1,2-Dibromoethane	< 30	< 6.74E-03	< 3.44E-03	< 0.2	< 4.49E-05	< 2.50E-04	NA
Perchloroethene	3160	8.95E-01	4.57E-01	< 0.2	< 5.66E-05	< 3.16E-04	> 99.93
Carbon tetrachloride	< 30	< 5.52E-03	< 2.82E-03	< 0.1	< 1.84E-05	< 1.03E-04	NA
Toluene	45600	5.01E+00	2.56E+00	1.27	< 1.40E-04	< 7.78E-04	99.97
1,1,1-trichloroethane	20.8	3.31E-03	1.69E-03	< 0.1	< 1.59E-05	< 8.86E-05	> 94.75
Trichloroethene	1160	1.82E-01	9.27E-02	< 0.1	< 1.57E-05	< 8.73E-05	> 99.91
Chloroform	< 20	< 2.84E-03	< 1.45E-03	< 0.1	< 1.42E-05	< 7.93E-05	NA
Vinyl Chloride	278	2.08E-02	1.06E-02	< 0.1	< 7.47E-06	< 4.16E-05	> 99.61
m+p-xylenes	28200	3.57E+00	1.82E+00	< 0.2	< 2.53E-05	< 1.41E-04	> 99.99
o-xylene	3900	4.94E-01	2.52E-01	0.8	< 1.01E-04	< 5.65E-04	> 99.78
TNMHC	12026890	2.30E+02	1.17E+02	5855	1.12E-01	6.24E-01	99.47

Note: All values preceded by "<" are below the detection limit. The reported values are the detection limit.

NA-Not Applicable: Destruction efficiency can not be calculated since both inlet and outlet values are below the detection limit.

APPENDIX C - Laboratory Results



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LABORATORY ANALYSIS REPORT

CO, CH₄, CO₂, TGNMO, and Ethane Analysis in Tanks
and Traps by SCAQMD Method 25 (FID/TCA)

Report Date: April 27, 2004
Client: Horizon Air Measurement
Project No.: W07-039
Source Location: Waste Management / Bradley Landfill / Sun Valley CA.
Source ID: Flare Inlet

Date Received: April 21, & 29, 2004
Date Analyzed: April 22, & 30, 2004

AtmAA Lab No.	Sample ID			Tank CO	Tank CH ₄	Tank CO ₂	Tank Ethane	Tank TGNMO	Trap CO ₂ in ICV	Tank O ₂	P ₁	P ₂
	Tank	Trap	ICV	(Concentrations in ppmv)						(%v)		
01124-7	C	U	12	53.1	412000	360000	8.09	1040	42400	1.76	542	820
01124-8	I	Y1	6	52.1	423000	363000	5.04	1240	42000	1.42	560	820

trap burn system blank H

78.3

TGNMO is total gaseous non-methane organics (excluding ethane) reported as ppm methane.
Ethane is reported as ppmv methane.

P₁ - Initial Pressure, mm Hg

P₂ - Final Pressure, mm Hg

Michael L. Porter
Laboratory Director

QUALITY ASSURANCE SUMMARY
(Repeat Analyses)

Client Project No.: W07-039

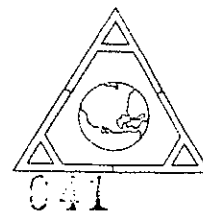
Date Received: April 21, & 29, 2004

Date Analyzed: April 22, & 30, 2004

Components	Sample ID	Repeat Analysis		Mean Conc.	% Diff. From Mean
		Run #1	Run #2		
(Concentration in ppmv)					
CO	TK C	53.7	52.5	53.1	1.1
	TK I	51.9	52.2	52.1	0.35
CH ₄	TK C	412000	412000	412000	0.0
CO ₂	TK C	358000	362000	360000	0.56
	TK I				
Ethane	TK C	8.08	8.11	8.09	0.13
	TK I	5.04	5.04	5.04	0.0
TGNMO	TK C	1040	1040	1040	0.0
	TK I	1240	1180	1210	2.5
CO ₂ in ICV (in trap, transfer tanks)	ICV 12	42100	42600	42400	0.59
(Concentration in %v)					
Oxygen	TK C	1.84	1.69	1.76	4.1

A set of 2 TCA samples, laboratory numbers 01124-(7 & 8), was analyzed for CO, CH₄, CO₂, total gaseous non-methane organics (TGNMO), and ethane. Agreement between repeat analyses is a measure of precision and is shown above in the column "% Difference from Mean". Repeat analyses are an important part of AtmAA's quality assurance program. The average % Difference from Mean for 10 repeat measurements from the sample set of 2 TCA samples is 0.94%.

Gas standards (containing CO, CH₄, CO₂ and isobutane) used for TCA analyses, were prepared and certified by Praxair.





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LABORATORY ANALYSIS REPORT

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Organic Carbon Analysis in Water Impingers, and Methane and TGNMO Analysis in
SUMMA Canister Samples from Impinger/Canister Train Sample Collection

Report Date: April 28, 2004

Client: Horizon

P.O. No.: Verbal

Client Project No.: W07-039

Source Location : Waste Management / Bradley Landfill / Sun Valley CA.

Date Received: April 21, 2004

Date Analyzed: April 21, & 26, 2004

ANALYSIS DESCRIPTION

Methane & TGNMO were measured by flame ionization detection/total combustion analysis (FID/TCA), Method 25. Organic carbon in water impinger samples were measured by Dohrman total organic carbon analyzer, water FID/TCA.

AtmAA Lab No.	Sample ID	Canister	Canister	Canister	Impinger Organic	Impinger Volume	P ₁	P ₂
		Methane	Ethane	TGNMO	Carbon as Methane			
		(Concentration in ppmv)			(ppmv)	(ml)		
01124-9	SUMMA S18	<1	<1	3.39	---	---	577	820
	Impinger 15H	---	---	---	2.16	1.98	---	---
01124-10	SUMMA S21	<1	<1	2.28	---	---	567	820
	Impinger 17H	---	---	---	3.88	2.22	---	---

*TGNMO is total gaseous non-methane organics (excluding ethane), reported as ppm methane.
Ethane is reported as ppmv methane.*

** Note - Impinger sample results are not blank corrected. The field blank (impinger U18), from another job, contained 1.69 ug carbon as methane, corresponding to 0.57 ppm methane for a 4.53 liter sample.
P₁ and P₂ are initial and final pressures measured in mm Hg.*

Michael L. Porter
Laboratory Director

QUALITY ASSURANCE SUMMARY
(Repeat Analyses)

Project No.: W07-039
Date Received: April 21, 2004
Date Analyzed: April 21, & 26, 2004

Components	Sample ID	Repeat Analysis		Mean Conc.	% Diff. From Mean
		Run #1	Run #2		
		(Concentration in ppmv)			
Methane	SUMMA S18	<1	<1	---	---
	SUMMA S21	<1	<1	---	---
Ethane	SUMMA S18	<1	<1	---	---
	SUMMA S21	<1	<1	---	---
TGNMO	SUMMA S18	3.39	3.38	3.39	0.15
	SUMMA S21	2.30	2.26	2.28	0.88
Impinger TOC	Impinger 15H	2.13	2.18	2.16	1.2
	Impinger 17H	3.91	3.84	3.88	0.90

A set of 2 canister/impinger samples, laboratory numbers 01124-(9 - 10), was analyzed for methane, ethane, total gaseous non-methane organics (TGNMO), and TOC. Agreement between repeat analysis is a measure of precision and is shown in the column "% Difference from Mean". Repeat analyses are an important part of AtmAA's quality assurance program. The average % Difference from Mean for 4 repeat measurements from the sample set of 2 canister/impinger samples is 0.77%.





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LABORATORY ANALYSIS REPORT

SCAQMD Rule 1150.1 Components Analysis in Inlet Gas Tedlar Bag Sample

Report Date: April 27, 2004

Client: Horizon

Project Location: Waste / Bradley Landfill

Client Project No.: W07-039

Date Received: April 21, 2004

Date Analyzed: April 21, 2004

AtmAA Lab No.: 01124-11

Sample I.D.: W07039-F#1

IN-TB-1

Components

Hydrogen sulfide

(Concentration in ppmv)

68.1

(Concentration in ppbv)

Benzene	2720
Benzylchloride	<40
Chlorobenzene	152
Dichlorobenzenes*	2120
1,1-dichloroethane	459
1,2-dichloroethane	95.6
1,1-dichloroethylene	64.9
Dichloromethane	1840
1,2-dibromoethane	<30
Perchloroethene	3160
Carbon tetrachloride	<30
Toluene	45600
1,1,1-trichloroethane	20.8
Trichloroethene	1160
Chloroform	<20
Vinyl chloride	278
m+p-xylenes	28200
o-xylene	3900

* total amount containing meta, para, and ortho isomers

Michael L. Porter
Laboratory Director



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LABORATORY ANALYSIS REPORT

Hydrogen Sulfide and Reduced Sulfur Compounds
Analysis in Inlet Tedlar Bag Sample

Report Date: April 27, 2004
Client: Horizon
Project Location: Waste / Bradley Landfill
Client Project No.: W07-039
Date Received: April 21, 2004
Date Analyzed: April 21, 2004

ANALYSIS DESCRIPTION

Hydrogen sulfide was analyzed by gas chromatography with a Hall electrolytic conductivity detector operated in the oxidative sulfur mode. All other components were measured by GC/ Mass Spec.

AtmAA Lab No.: 01124-11
Sample I.D.: W07039-F#1

IN-TB-1
(Concentration in ppmv)

Components

Hydrogen sulfide	68.1
Carbonyl sulfide	0.39
Methyl mercaptan	2.58
Ethyl mercaptan	<0.09
Dimethyl sulfide	6.26
Carbon disulfide	0.10
isopropyl mercaptan	0.32
n-propyl mercaptan	<0.06
Dimethyl disulfide	0.22
TRS	78.3

TRS - total reduced sulfur

Michael L. Porter
Laboratory Director

QUALITY ASSURANCE SUMMARY
(Repeat Analyses)

Client Project No.: W07-039
Date Received: April 21, 2004
Date Analyzed: April 21, 2004

Components	Sample ID	Repeat Analysis		Mean Conc.	% Diff. From Mean
		Run #1	Run #2		
(Concentration in ppbv)					
Benzene	W07039-F#1-IN-TB-1	2660	2790	2720	2.4
Benzylchloride	W07039-F#1-IN-TB-1	<40	<40	---	---
Chlorobenzene	W07039-F#1-IN-TB-1	151	152	152	0.33
Dichlorobenzenes	W07039-F#1-IN-TB-1	2120	2110	2120	0.24
1,1-dichloroethane	W07039-F#1-IN-TB-1	445	473	459	3.0
1,2-dichloroethane	W07039-F#1-IN-TB-1	88.3	103	95.6	7.7
1,1-dichloroethylene	W07039-F#1-IN-TB-1	69.0	60.8	64.9	6.3
Dichloromethane	W07039-F#1-IN-TB-1	1680	2000	1840	8.7
1,2-dibromoethane	W07039-F#1-IN-TB-1	<30	<30	---	---
Perchloroethene	W07039-F#1-IN-TB-1	3070	3240	3160	2.7
Carbon tetrachloride	W07039-F#1-IN-TB-1	<30	<30	---	---
Toluene	W07039-F#1-IN-TB-1	44800	46500	45600	1.9
1,1,1-trichloroethane	W07039-F#1-IN-TB-1	19.5	22.0	20.8	6.0
Trichloroethene	W07039-F#1-IN-TB-1	1130	1200	1160	3.0
Chloroform	W07039-F#1-IN-TB-1	<20	<20	---	---
Vinyl chloride	W07039-F#1-IN-TB-1	268	289	278	3.8
m+p-xylenes	W07039-F#1-IN-TB-1	28000	28500	28200	0.88
o-xylene	W07039-F#1-IN-TB-1	3870	3920	3900	0.64



QUALITY ASSURANCE SUMMARY
(Repeat Analyses)
(continued)

Sulfur Components	Sample ID	Repeat Analysis		Mean Conc.	% Diff. From Mean
		Run #1	Run #2		
		(Concentration in ppmv)			
Hydrogen sulfide	W07039-F#1-IN-TB-1	67.5	68.7	68.1	0.88
Carbonyl sulfide	W07039-F#1-IN-TB-1	0.39	0.39	0.39	0.0
Methyl mercaptan	W07039-F#1-IN-TB-1	2.54	2.62	2.58	1.6
Ethyl mercaptan	W07039-F#1-IN-TB-1	<0.09	<0.09	---	---
Dimethyl sulfide	W07039-F#1-IN-TB-1	6.23	6.28	6.26	0.40
Carbon disulfide	W07039-F#1-IN-TB-1	0.11	0.10	0.10	4.8
iso-propyl mercaptan	W07039-F#1-IN-TB-1	0.31	0.32	0.32	1.6
n-propyl mercaptan	W07039-F#1-IN-TB-1	<0.06	<0.06	---	---
Dimethyl disulfide	W07039-F#1-IN-TB-1	0.22	0.21	0.22	2.3

One Tedlar bag sample, laboratory number 01124-11, was analyzed for SCAQMD Rule 1150.1 components, hydrogen sulfide, and total reduced sulfur compounds. Agreement between repeat analyses is a measure of precision and is shown above in the column "% Difference from Mean". Repeat analyses are an important part of AtmAA's quality assurance program. The average % Difference from Mean for 21 repeat measurements from the one Tedlar bag sample is 2.8%.





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LABORATORY ANALYSIS REPORT

SCAQMD Rule 1150.1 Components Analysis in Outlet Tedlar Bag Sample

Report Date: April 26, 2004

Client: Horizon

Project Location: Waste / Bradley Landfill

Client Project No.: W07-039

Date Received: April 21, 2004

Date Analyzed: April 21, 2004

AtmAA Lab No.: 01124-12

Sample I.D.: W07039-F#1

EXH-TB-1

Components

(Concentration in ppbv)

Hydrogen sulfide	<500
Benzene	<0.2
Benzylchloride	<0.8
Chlorobenzene	<0.2
Dichlorobenzenes*	<1.1
1,1-dichloroethane	<0.2
1,2-dichloroethane	<0.2
1,1-dichloroethylene	<0.2
Dichloromethane	1.04
1,2-dibromoethane	<0.2
Perchloroethene	<0.1
Carbon tetrachloride	<0.1
Toluene	1.27
1,1,1-trichloroethane	<0.1
Trichloroethene	<0.1
Chloroform	<0.1
Vinyl chloride	<0.2
m+p-xylenes	0.80
o-xylene	<0.2

* total amount containing meta, para, and ortho isomers

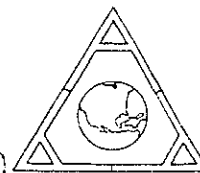
Michael L. Porter
Laboratory Director

QUALITY ASSURANCE SUMMARY
(Repeat Analyses)

Client Project No.: W07-039
Date Received: April 21, 2004
Date Analyzed: April 21, 2004

Components	Sample ID	Repeat Analysis		Mean Conc.	% Diff. From Mean
		Run #1	Run #2		
(Concentration in ppbv)					
Hydrogen sulfide	W07039-F#1-EXH-TB-1	<500	<500	---	---
Benzene	W07039-F#1-EXH-TB-1	<0.2	<0.2	---	---
Benzylchloride	W07039-F#1-EXH-TB-1	<0.8	<0.8	---	---
Chlorobenzene	W07039-F#1-EXH-TB-1	<0.2	<0.2	---	---
Dichlorobenzenes	W07039-F#1-EXH-TB-1	<1.1	<1.1	---	---
1,1-dichloroethane	W07039-F#1-EXH-TB-1	<0.2	<0.2	---	---
1,2-dichloroethane	W07039-F#1-EXH-TB-1	<0.2	<0.2	---	---
1,1-dichloroethylene	W07039-F#1-EXH-TB-1	<0.2	<0.2	---	---
Dichloromethane	W07039-F#1-EXH-TB-1	1.04	1.03	1.04	0.48
1,2-dibromoethane	W07039-F#1-EXH-TB-1	<0.2	<0.2	---	---
Perchloroethene	W07039-F#1-EXH-TB-1	<0.1	<0.1	---	---
Carbon tetrachloride	W07039-F#1-EXH-TB-1	<0.1	<0.1	---	---
Toluene	W07039-F#1-EXH-TB-1	1.33	1.21	1.27	4.7
1,1,1-trichloroethane	W07039-F#1-EXH-TB-1	<0.1	<0.1	---	---
Trichloroethene	W07039-F#1-EXH-TB-1	<0.1	<0.1	---	---
Chloroform	W07039-F#1-EXH-TB-1	<0.1	<0.1	---	---
Vinyl chloride	W07039-F#1-EXH-TB-1	<0.2	<0.2	---	---
m+p-xylenes	W07039-F#1-EXH-TB-1	0.77	0.83	0.80	3.7
o-xylene	W07039-F#1-EXH-TB-1	<0.2	<0.2	---	---

One Tedlar bag sample, laboratory number 01124-12, was analyzed for SCAQMD Rule 1150.1 components. Agreement between repeat analyses is a measure of precision and is shown above in the column "% Difference from Mean". Repeat analyses are an important part of AtmAA's quality assurance program. The average % Difference from Mean for 3 repeat measurements from one Tedlar bag sample is 3.0%.



LABORATORY ANALYSIS REPORT

Carbon Monoxide Analysis in Tedlar Bag Sample

Report Date: May 7, 2004
Client: Horizon
P.O. No.: Verbal
Client Project No.: W07-039
Source Location : Bradley Landfill / Sun Valley CA.
Source ID: Flare 1 Exhaust

Date Received: April 21, 2004
Date Analyzed: May 7, 2004

ANALYSIS DESCRIPTION

Carbon monoxide was measured by flame ionization detection/total combustion analysis (FID/TCA), Method 25.

AtmAA Lab No.: 01124-12
Sample I.D.: W07039-F1-Exh-TB-1

<u>Component</u>	(Concentration in ppmv)
Carbon monoxide	119
(repeat)	114

Michael L. Porter
Laboratory Director

LABORATORY ANALYSIS REPORT

Carbon Monoxide Analysis in Tedlar Bag Sample

Report Date: May 11, 2004
Client: Horizon
P.O. No.: Verbal
Client Project No.: W07-039
Source Location : Bradley Landfill / Sun Valley CA.
Source ID: Flare 1 Exhaust

Date Received: April 21, 2004
Date Analyzed: May 11, 2004

ANALYSIS DESCRIPTION

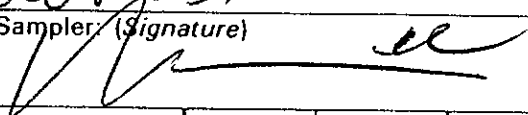
Carbon monoxide was measured by flame ionization detection/total combustion analysis (FID/TCA), Method 25.

AtmAA Lab No.: 01124-13
Sample I.D.: W07039-F1-Exh-CO-2

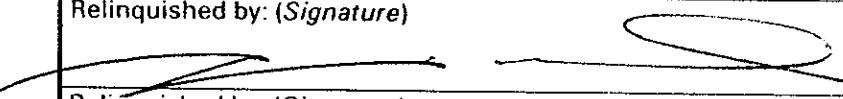
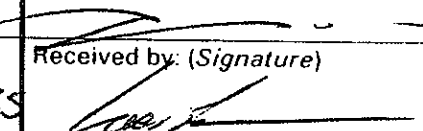
<u>Component</u>	(Concentration in ppmv)
Carbon monoxide	116
(repeat)	111

Michael L. Porter
Laboratory Director

CHAIN OF CUSTODY RECORD

Client/Project Name Waste/Bradley LREC			Project Location San Valley, CA		
Project No. W07-039			Field Logbook No.		
Sampler: (Signature) 			Chain of Custody Tape No.		

Sample No./ Identification	Date	Time	Lab Sample Number	Type of Sample	ANALYSES	REMARKS
TANK # C			01124-7			
I			-8			
Summer S18			-9			
S21			-10			
W07039-#1-In-TB-1			-11			
W07039-#1-In-TB-2						
W07039-#1-Exh-TB-1			-12			
W07039-#1-Exh-TB-2						
W07039-#1-Exh-EO-2-13						

Relinquished by: (Signature) 	Date 04.21.04	Time 0935	Received by: (Signature) 	Date 04.21.04	Time 0800
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received for Laboratory: (Signature)	Date	Time

Sample Disposal Method:	Disposed of by: (Signature)	Date	Time
-------------------------	-----------------------------	------	------

SAMPLE COLLECTOR HORIZON AIR MEASUREMENT SERVICES, INC 996 Lawrence Drive, Suite 108 Newbury Park, CA 91320 (805) 498-8781 Fax (805) 498-3173	ANALYTICAL LABORATORY <div style="text-align: right; font-size: 1.2em; font-weight: bold;">Nº 8505</div>
---	---

0002

Facility: WASTE MANAGEMENT
Source: FLARE 1
Job No.: W07-039
Test Date: 04/19-20/04

SCAQMD Method 5.1

DATA SHEET FOR PARTICULATE MATTER SCAQMD METHOD 5.1

DATE SAMPLED: 04/20-21/04
DATE EXTRACTED: 05/03/04

RUN #1

	SAMPLE ID	BEAKER/ FILTER ID	VOLUME	INITIAL	FINAL	NET WEIGHT(g)
A - FILTER CATCH FILTER ACID FILTER SULFATE	W07039-F#1-EXH-M5-PF1	Q00127	NA	0.1491	0.1502	0.0011 0.0000
B - PROBE CATCH PROBE ACID PROBE SULFATE						0.0000 0.0000 0.0000
C - IMP. CATCH (INSOL) INSOLUBLE ACID INSOLUBLE SULFATE	W07039-F#1-EXH-M5-EF1	Q00133	678	0.1501	0.1507	0.0006 0.0000 0.0000
D - IMP. CATCH (SOL) SOLUBLE ACID SOLUBLE SULFATE	W07039-F#1-EXH-M5-R1	040102	678	29.3711	29.3891	0.0180 0.0000 0.0000
E - ORGANIC EXTRACT	W07039-F#1-EXH-M5-MC1	040113	125	29.9509	29.9537	0.0028

TOTAL PARTICULATE	(A+B+C+D+E)					0.0225
SOLID PARTICULATE	(A+B+C+D)					0.0197

Facility: WASTE MANAGEMENT
Source: FLARE 1
Job No.: W07-039
Test Date: 04/20-21/04

SCAQMD Method 5.1

DATA SHEET FOR PARTICULATE MATTER SCAQMD METHOD 5.1

DATE SAMPLED: 04/20-21/04
DATE EXTRACTED: 05/03/04

RUN #2

	SAMPLE ID	BEAKER/ FILTER ID	VOLUME	INITIAL	FINAL	NET WEIGHT(g)
A - FILTER CATCH FILTER ACID FILTER SULFATE	W07039-F#1-EXH-M5-PF2	Q00128	NA	0.1514	0.1527	0.0013 0.0000 0.0000 0.0000
B - PROBE CATCH PROBE ACID PROBE SULFATE						0.0000
C - IMP.CATCH(INSOL) INSOLUBLE ACID INSOLUBLE SULFATE	W07039-F#1-EXH-M5-EF2	Q00131	730	0.1509	0.1516	0.0007 0.0000 0.0000
D - IMP. CATCH (SOL) SOLUBLE ACID SOLUBLE SULFATE	W07039-F#1-EXH-M5-R2	040108	730	29.5228	29.5332	0.0104 0.0000 0.0000
E - ORGANIC EXTRACT	W07039-F#1-EXH-M5-MC2	040110	125	29.7310	29.7336	0.0026

TOTAL PARTICULATE	(A+B+C+D+E)					0.0150
SOLID PARTICULATE	(A+B+C+D)					0.0124

CHAIN OF CUSTODY RECORD

Client/Project Name Waste / Borehole LFRC				Project Location San Valley, CA				ANALYSES			
Project No. W07-039				Field Logbook No.							
Sampler: (Signature) 				Chain of Custody Tape No.							

Sample No./ Identification	Date	Time	Lab Sample Number	Type of Sample	REMARKS
W07039-F#1-MC-DE-1				X	
W07039-F#1-MC-R-1				X	
W07039-F#1-MC-IF-2				X	
W07039-F#1-MC-R-2				X	

Relinquished by: (Signature) 			Date 04/04/04	Time 1800	Received by: (Signature)			Date	Time
Relinquished by: (Signature)			Date	Time	Received by: (Signature)			Date	Time
Relinquished by: (Signature)			Date	Time	Received for Laboratory: (Signature) 			Date 04-2004	Time 1800

Sample Disposal Method:			Disposed of by: (Signature)			Date	Time
-------------------------	--	--	-----------------------------	--	--	------	------

SAMPLE COLLECTOR HORIZON AIR MEASUREMENT SERVICES, INC 996 Lawrence Drive, Suite 108 Newbury Park, CA 91320 (805) 498-8781 Fax (805) 498-3173				ANALYTICAL LABORATORY				Nº 7483	
--	--	--	--	------------------------------	--	--	--	----------------	--

APPENDIX D - Field Data Sheets

057

Impressions of the world are not the same for all people. The same thing may be seen in different ways by different people. The same thing may be seen in different ways by different people.

What if you could?

1990

1

Individuals with a history of alcohol abuse are at an increased risk of developing a substance use disorder (SUD) and may require specialized treatment. This paper discusses the importance of early identification and intervention for individuals with a history of alcohol abuse, the role of family in the treatment process, and the importance of ongoing support and monitoring.

1



1



PARTICULATE FIELD DATA

PLANT 3rd Valley LLC
 DATE 04/20/09
 LOCATION 3rd Valley, CA
 OPERATOR He
 SOURCE Process Inlet
 RUN NO. 1-416
 SAMPLE BOX NO. C-6
 TIME START 1600

METER BOX NO. 7
 METER ΔH @ 1.5144
 Y= 1.0076
 PROBE I.D. NO. N/A
 NOZZLE DIAMETER, in. N/A
 STACK DIAMETER, in. 13.25
 PROBE HEATER SETTING N/A
 HEATER BOX SETTING N/A
 Δ Cp FACTOR N/A
 FILTER NO. N/A

ASSUMED MOISTURE, % N/A
 AMBIENT TEMPERATURE N/A
 BARO. PRESS. 29.23
 STATIC PRESS. N/A
 NOMOGRAPH INDEX N/A

PRE TEST LEAK CHECKS
 METER <0.001 @ 10 in. Hg
 PITOTS @ in. Hg
 ORSAT

P#	TIME	T _s °F	ΔP in H ₂ O	√ΔP	ΔH in H ₂ O	V _m ft ³	T _{amb} °F	T _{in} OUT °F	OVEN °F	IMP. OUT °F	VAC. (in Hg)
F	00	N/A	N/A	N/A	1.5	605.386	70	79	N/A	62	2
	10				1.5	612.8	85	80		51	2
	20				1.5	620.54	88	80		54	2
	30				1.5	627.8	90	81		55	2
	40				1.5	635.2	91	82		56	2
	50				1.5	642.7	91	82		58	2
	60					650.201					
Avg					1.50	448.5		860			

TIME END = 1700

Volume of Liquid Water Collected	Impinger Volume				Silica Gel Wght.
	1	2	3	4	
Final	139	106	3		294
Initial	100	100	0		280
Liquid Collected					
Total Vol. Collected					61.0

POST TEST LEAK CHECKS
 Meter <0.001 @ 4 in. Hg
 Pitots @ in. Hg
 Orsat

Orsat Meas.	Time	CO ₂	O ₂	CO	N ₂
1					
2					
3					
Nozzle Cal	D ₁	D ₂	D ₃	Average	
				659	

PLANT Biphenyl large
DATE 04/26/04
LOCATION Sub Well #1, CRT
OPERATOR MC
SOURCE Plant #1
RUN NO. 2 - Schum's meth 4.1
SAMPLE BOX NO. CRT
TIME START 17:51

METER BOX NO. _____
METER ΔH @ _____ 1.5144
Y= _____ 1.0076
PROBE I.D. NO. _____ 10 1A
NOZZLE DIAMETER, in. _____ NA
STACK DIAMETER, in. _____ 13.00
PROBE HEATER SETTING _____ NA
HEATER BOX SETTING _____ NA
 ΔC_p FACTOR _____ 10 NA
FILTER NO. _____ NA

ASSUMED MOISTURE, % 77
 AMBIENT TEMPERATURE 28.04
 BARO. PRESS. 29.23
 STATIC PRESS. NA
 NOMOGRAPH INDEX NA

METER LOW @ 10 in. Hg
PITOTS @ in. Hg
ORSAT

[illegible]

TIME END = 1:22

Volume of Liquid Water Collected	Impinger Volume				Silica Gel Wght.
	1	2	3	4	5
Final	130	110	4		318
Initial	100	100	0		280
Liquid Collected	30	10	4		38 ✓
Total Vol. Collected					92.0

POST TEST LEAK CHECKS

Meter LO. 001 @ 5 in. Hg

Pitots @ _____ in. Hg

Orsat _____

POST TEST LEAK CHECKS

Orsat Meas.		Time	CO ₂	O ₂	CO	N ₂
1						
2						
3						
Nozzle Cal		D ₁	D ₂	D ₃	Average	
					000	

PARTICULATE FIELD DATA

PLANT Brockley LTR
 DATE 09/20/01
 LOCATION San Valley, CA
 OPERATOR Mike
 SOURCE Flare
 RUN NO. 1-500
 SAMPLE BOX NO. C-6

TIME START 1224 1600

METER BOX NO. 4
 METER ΔH @ 1.7007
 Y= 1.0075
 PROBE I.D. NO. 10-2
 NOZZLE DIAMETER, in. 1.090
 STACK DIAMETER, in. 1.441
 PROBE HEATER SETTING N/A
 HEATER BOX SETTING N/A
 Δ Cp FACTOR 0.84
 FILTER NO. 000124

ASSUMED MOISTURE, % 10
 AMBIENT TEMPERATURE 100°F
 BARO. PRESS. 29.25
 STATIC PRESS. 29.25
 NOMOGRAPH INDEX 360

PRE TEST LEAK CHECKS
 METER 0.001 @ 14 in. Hg
 PITOTS ✓ @ 23 in. Hg
 ORSAT ✓

P#	TIME	T _s in H ₂ O	ΔP in H ₂ O	√ΔP	ΔH in H ₂ O	V _m ft ³	T _{amb} °F	T _{in} OUT °F	OVEN °F	IMP. OUT °F	VAC. (in Hg)
		1529		1.2	3.6						
4-12	00	1517	0.01		3.6	073.810	69	69	N/A	68	5
11	25	1536	0.01		3.6	076.3	71	69		60	5
10	50	1541	0.01		3.6	078.3	71	69		60	5
9	75	1519	0.01		3.6	081.3	72	69		54	5
8	100	1483	0.01		3.6	083.8	72	69		57	5
7	125	1522	0.01		3.6	086.3	73	69		58	5
6	150	1518	0.01		3.6	088.8	74	70		59	5
5	175	1556	0.01		3.6	091.3	74	70		56	5
4	200	1541	0.01		3.6	093.7	75	70		56	5
3	225	1515	0.01		3.6	096.4	75	70		53	5
2	250	1564	0.01		3.6	099.1	75	70		56	5
1	275	1519	0.01		3.6	100.0	76	70		56	5
13-12	300	1528	0.01		3.6	104.518	71	70		61	5
11	325	1526	0.01		3.6	107.1	72	71		60	5
10	350	1514	0.01		3.6	109.8	74	70		58	5
9	375	1530	0.01		3.6	112.5	74	70		56	5
8	400	1524	0.01		3.6	115.4	75	70		56	5
7	425	1539	0.01		3.6	117.9	75	70		57	5
6	450	1518	0.01		3.6	120.7	75	71		59	5
5	475	1514	0.01		3.6	123.2	75	71		60	5
4	500	1520	0.01		3.6	125.4	76	71		60	5
3	525	1520	0.01		3.6	128.4	75	71		59	5
2	550	1519	0.01		3.6	131.3	75	71		58	5
1	575	1529	0.01		3.6	133.9	75	71		58	5
	600					136.12					
Avg.		1527.4		0.100	3.60	62.802		72.0			

TIME END = 1506

Volume of Liquid Water Collected	Impinger Volume				Silica Gel Wght.
	1	2	3	4	
Final	200	112	8		275
Initial	100	100	0		261
Liquid Collected	100	12	8		14
Total Vol. Collected					134.0

POST TEST LEAK CHECKS
 Meter 50/100 @ 9 in. Hg
 Pitots ✓ @ 23/23 in. Hg
 Orsat ✓

Orsat Meas.	Time	CO ₂	O ₂	CO	N ₂
1					
2					
3					
Nozzle Cal	D ₁	D ₂	D ₃	Average	
	1.090	1.090	1.091	1.090	

PARTICULATE FIELD DATA

PLANT Browley LERC
 DATE 10/20/04
 LOCATION Sch Valley, CA
 OPERATOR De, C, M, T, W
 SOURCE Flue #1
 RUN NO. 2-SCAQM C-1
 SAMPLE BOX NO. C-2

TIME START 1751

METER BOX NO. 4
 METER ΔH @ 1.7007
 Y= 1.0055
 PROBE I.D. NO. 10-2
 NOZZLE DIAMETER, in. 1.09
 STACK DIAMETER, in. 144
 PROBE HEATER SETTING N/A
 HEATER BOX SETTING N/A
 Δ Cp FACTOR 0.84
 FILTER NO. 00028

ASSUMED MOISTURE, % 10
 AMBIENT TEMPERATURE 80.4
 BARO. PRESS. 29.23
 STATIC PRESS. -0.01
 NOMOGRAPH INDEX 360

PRE TEST LEAK CHECKS
 METER 50.001 @ 10 in. Hg
 PITOTS ✓ @ 33/33 in. Hg
 ORSAT ✓

P#	TIME	T _s °F	ΔP in H ₂ O	√ΔP	ΔH in H ₂ O	V _m ft ³	T _{in} °F	T _{out} °F	OVEN °F	IMP. OUT °F	VA (in Hg)
A-12	10	1490	0.01		3.6	936.936	66	66	N/A	52	7
11	20	1497	0.01		3.6	939.7	66	66		40	7
10	30	1503	0.01		3.6	942.5	66	66		50	7
9	40	1497	0.01		3.6	945.0	66	66		50	7
8	50	1492	0.01		3.6	947.7	70	66		52	7
7	100	1523	0.01		3.6	950.3	70	66		52	7
6	150	1528	0.01		3.6	952.9	71	66		53	7
5	175	1509	0.01		3.6	955.6	71	66		53	7
4	200	1530	0.01		3.6	958.3	72	66		52	7
3	225	1522	0.01		3.6	961.0	72	66		52	7
2	250	1521	0.01		3.6	963.6	72	66		53	7
1	275	1522	0.01		3.6	966.3	72	66		53	7
B-12	300	1518	0.01		3.6	969.097	66	66		53	7
11	325	1546	0.01		3.6	971.7	66	66		51	7
10	350	1544	0.01		3.6	974.3	67	66		49	7
9	375	1526	0.01		3.6	977.0	69	66		51	7
8	400	1533	0.01		3.6	979.8	70	66		51	7
7	425	1524	0.01		3.6	982.4	70	66		51	7
6	450	1521	0.01		3.6	985.0	70	66		51	7
5	475	1519	0.01		3.6	987.6	71	66		52	7
4	500	1532	0.01		3.6	990.4	71	66		52	7
3	525	1542	0.01		3.6	993.0	71	66		52	7
2	550	1508	0.01		3.6	995.6	71	66		52	7
1	575	1532	0.01		3.6	998.4	70	66		52	7
	600	N/A				1001.245					
Avg.		15201		0.1000	3.60	64.310		67.6			

TIME END = 1854

Volume of Liquid Water Collected	Impinger Volume				Silica Gel Wght.
	1	2	3	4	
Final	98	108	4		284
Initial	100	100	0		279
Liquid Collected	98	8	4		10
Total Vol. Collected					115.0

POST TEST LEAK CHECKS

Meter 40.091 @ 10 in. Hg
 Pitots ✓ @ 33/33 in. Hg
 Orsat ✓

Orsat Meas.	Time	CO ₂	O ₂	CO	N ₂
1					
2					
3					

Nozzle Cal	D ₁	D ₂	D ₃	Average
				0.02

**TOTAL COMBUSTION ANALYSIS
SCAQMD METHOD 25
FIELD SAMPLING DATA SHEET**

Job #: W07039
Facility: Bon Valley LP
Location: Son Valley, CA
Date: 04/20/04
Operator: W

Control Device: LFG Flare #1
Sample Location: Talet
Ambient Temp.: 180°F
Baro. Pressure: ~~29.33~~ 29.25
W

SAMPLE A

Tank #: C Trap #: U
Initial Vacuum: 2.5
Final Vacuum: _____
Start Time: _____

SAMPLE B

Tank #: I Trap #: 741
Initial Vacuum: 2.5
Final Vacuum: _____
End Time: _____

TIME (min.)	VACUUM ("Hg)	FLOW (cc/min)
1600 00	29	100
05	27.5	100
10	26	100
15	24	100
20	22.5	100
25	21	100
30	19.5	100
35	18	100
40	16.5	100
45	15	100
50	13.5	100
55	12	100
1700 60	9	

TIME (min.)	VACUUM ("Hg)	FLOW (cc/min)
00	29	100
05	27.5	100
10	26	100
15	24	100
20	22	100
25	20.5	100
30	19	100
35	17.5	100
40	16	100
45	14.5	100
50	13	100
55	10	100
60	8	

LEAK RATE

Pre Test: ✓ ✓
Post Test: ✓ ✓

**TOTAL COMBUSTION ANALYSIS
SCAQMD METHOD 25
FIELD SAMPLING DATA SHEET**

Job #: W07-035
Facility: WM / Bradley
Location: San Valley
Date: 4/20/04
Operator: TN

Control Device: Flare #1
Sample Location: OUTLET
Ambient Temp.: ~80°F
Baro. Pressure: 29.25

SAMPLE A

Tank #: S18 Trap #: 15H
Initial Vacuum: 30" / 2.5 mm
Final Vacuum: 6"
Start Time: _____

SAMPLE B

Tank #: S21 Trap #: 17H
Initial Vacuum: 29 1/2" 2.5 mm
Final Vacuum: 6"
End Time: _____

TIME (min.)	VACUUM ("Hg)	FLOW (cc/min)
1600 00	30"	
05	28	
10	26	
15	24	
20	22	
25	20	
30	18	
35	16	
40	14	
45	12	
50	10	
55	8	
700 60	6	

TIME (min.)	VACUUM ("Hg)	FLOW (cc/min)
00	29 1/2"	
05	28	
10	26	
15	24	
20	22	
25	20	
30	18	
35	16	
40	14	
45	12	
50	9 1/2	
55	7 1/2	
60	6	

LEAK RATE

Pre Test : ✓✓ ~
Post Test: ✓✓ ~

CEM TEMPERATURE DATA

Facility: WM / Bradley

Date: 04 / 20 / 04

Job No.: W07-039

Run #: 1

Source: Flare #1

Probe Temp Settings: >250°F

Heated Line Temp Settings: >250°F

	Time	TEMPERATURES °F		
		Condenser Outlet	Probe	Teflon Line
1	R1 00	34	>250°	>250°
2	10	35		
3	20	35		
4	30	36		
5	40	36		
6	50	36		
7	60	36		
8	R2 10	35		
9	20	36		
10	30	36		
11	40	36		
12	50	36		
13	60	36		
14				
15				

APPENDIX E - Calibration Information

Control Box Calibration Data

Date: 04/02/04

Calibrated by: Ferodie Jesus Orara Torres

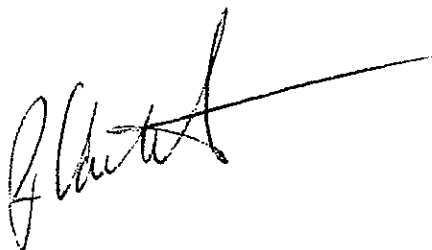
Meter Box Number: 4

Barometric Pressure: 29.10

Wet Test Meter Cf: 0.9977

Orifice setting (H)	Gas Volumes			Temperatures			Time (min)	Y	H@
	Wet Test (cu.ft)	Dry Gas Initial (cu.ft)	Dry Gas Final (cu.ft)	DGM Initial (°F)	DGM final (°F)	WTM (°F)			
0.5	25.583	1040.859	1066.025	70	71	71	60	1.0110	1.6012
1.0	9.993	1030.875	1040.706	69	71	71	17	1.0087	1.6865
1.5	31.808	999.057	1030.666	70	70	71	45	0.9992	1.7446
2.0	17.831	980.951	998.611	71	73	70	22	1.0056	1.7601
3.0	21.313	959.500	980.562	70	73	70	21	1.0053	1.6822
4.0	61.283	898.889	959.264	65	73	69	53	1.0030	1.7296
AVERAGE								1.0055	1.7007

Reviewed by:



Control Box Calibration Data

Date: 04/01/04

Calibrated by: Ferodie Jesus Orara Torres

Meter Box Number: 7

Barometric Pressure: 29.15

Wet Test Meter Cf: 0.9971

Orifice setting (H)	Gas Volumes			Temperatures			Time (min)	Y	H@
	Wet Test (cu.ft)	Dry Gas Initial (cu.ft)	Dry Gas Final (cu.ft)	DGM Initial (°F)	DGM final (°F)	WTM (°F)			
0.5	10.860	481.057	491.805	77	79	72	24	1.0171	1.4058
1.0	10.554	470.230	480.784	79	81	72	17	1.0091	1.4881
1.5	23.823	446.051	469.930	79	82	71	32	1.0083	1.5450
2.0	30.126	415.545	445.746	79	83	71	35	1.0078	1.5396
3.0	16.789	398.167	415.011	79	84	71	16	1.0054	1.5526
4.0	13.344	384.495	397.891	76	83	71	11	0.9981	1.5553
AVERAGE								1.0076	1.5144

Reviewed by:



Magnehelic Gauge Calibration Data

Range: 0.0-1.00"

Date: 01/26/04

Calibrated by: Ferodie Jesus Orara Torres

BAROMETRIC PRESURE: 29.20

Reference: 0.0-10.0" MANOMETER

SYSTEM

LEAK CHECKS (Y/N): Y

POINT

LEAK CHECK (Y/N): Y

Magnehelic Box # 1

Serial # R970865M62

MAG	MAN R1	MAN R2	MAN R3	MEAN	MEAN/MAG
0.20	0.20	0.20	0.20	0.201	1.005
0.40	0.40	0.40	0.40	0.400	1.000
0.60	0.60	0.60	0.60	0.600	1.000
0.80	0.80	0.80	0.80	0.798	0.997
1.00	1.00	1.00	1.00	1.000	1.000

Correction Factor:

1.0004

Date: 1/27/04

Checked by: [Signature]

STACK TEMPERATURE SENSOR CALIBRATION DATA- APEX PROBE ASSEMBLIES

Date: 01/05-07/04

Calibrated by: Ferodie Jesus Orara Torres and Craig Moran

THERMOCOUPLE

ID:

	ICE WATER						ABSOLUTE T DIFF. %			BOILING WATER						ABSOLUTE T DIFF. %			BOILING OIL						ABSOLUTE T DIFF. %		
	REF			TC						REF			TC						REF			TC					
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Stainless Steel Probes																											
3-1	34	34	34	36	37	37	-0.4	-0.6	-0.6	212	212	212	212	212	212	0.0	0.0	0.0	448	448	448	446	447	447	0.2	0.1	0.1
4-2	34	34	34	34	35	35	0.0	-0.2	-0.2	212	212	212	214	214	214	-0.3	-0.3	-0.3	430	430	430	429	430	431	0.1	0.0	-0.1
4-3	34	34	34	34	35	35	0.0	-0.2	-0.2	212	212	212	213	214	214	-0.1	-0.3	-0.3	450	450	450	456	452	457	-0.7	-0.2	-0.8
6-2	33	33	33	34	33	33	-0.2	0.0	0.0	205	205	205	206	206	206	-0.2	-0.2	0.0	465	465	465	463	462	463	0.2	0.3	0.2
6-3	34	34	34	36	36	35	-0.4	-0.4	-0.2	212	212	212	212	212	213	0.0	0.0	-0.1	432	432	432	439	438	438	-0.8	-0.7	-0.7
6-4	33	33	33	34	35	34	-0.2	-0.4	-0.2	212	212	212	216	216	216	0.2	-0.6	-0.6	440	440	440	432	433	435	0.9	0.8	0.6
A6-5	34	34	34	34	34	34	0.0	0.0	0.0	212	212	212	215	214	214	-0.4	-0.3	-0.3	540	540	540	535	537	538	0.5	0.3	0.2
A8-1	34	34	34	34	34	34	0.0	0.0	0.0	212	212	212	214	215	214	-0.3	-0.4	-0.3	542	542	542	538	539	539	0.4	0.3	0.3
A8-2	34	34	34	34	34	34	0.0	0.0	0.0	212	212	212	215	215	215	-0.4	-0.4	-0.4	542	542	542	545	545	545	-0.3	-0.3	-0.3
10-1	34	34	34	35	35	35	-0.2	-0.2	-0.2	212	212	212	211	211	210	0.1	0.1	0.3	540	540	540	540	539	539	0.0	0.1	0.1
16-1	32	32	32	33	32	32	-0.2	0.0	0.0	212	212	212	212	212	212	0.0	0.0	0.0	529	529	529	529	529	530	0.0	0.0	-0.1
M17-1	33	33	33	34	33	33	-0.2	0.0	0.0	212	212	212	214	213	213	-0.3	-0.1	-0.1	450	450	450	448	446	447	0.2	0.4	0.3
M17-2	35	35	35	38	38	38	-0.6	-0.6	-0.6	212	212	212	214	213	213	-0.3	-0.1	-0.1	450	450	450	458	446	447	-0.9	0.4	0.3
M17-3	34	34	34	35	34	34	-0.2	0.0	0.0	200	200	200	198	199	200	0.3	0.2	0.0	460	460	460	458	461	460	0.2	-0.1	0.0
Inconel																											
10-2 Inc	34	34	34	34	34	34	0.0	0.0	0.0	212	212	212	211	211	210	0.1	0.1	0.3	540	540	540	540	539	539	0.0	0.1	0.1
6-1 Inc	32	32	32	33	33	32	-0.2	-0.2	0.0	212	212	212	213	213	213	-0.1	-0.1	-0.1	541	541	540	541	541	540	0.0	0.0	0.0
Loose Thermocouple																											
6-8	33	33	33	34	33	33	-0.2	0.0	0.0	212	212	212	211	212	212	0.1	0.0	0.0	450	450	450	452	453	452	-0.2	-0.3	-0.2
6-7	33	33	33	34	33	33	-0.2	0.0	0.0	200	200	200	198	199	198	0.3	0.2	0.3	465	465	465	461	465	463	0.4	0.0	0.2
7-2	34	34	34	34	34	33	0.0	0.0	0.2	212	212	212	211	211	211	0.1	0.1	0.1	450	450	450	451	451	451	-0.1	-0.1	-0.1
8-3	33	33	33	34	33	33	-0.2	0.0	0.0	212	212	212	211	212	212	0.1	0.0	0.0	450	450	450	451	451	450	-0.1	-0.1	0.0

Note: If absolute temperature values of the reference thermometer being calibrated and the stack temperature sensors agree within 1.5 percent at each of the three calibration points, no correction is needed.

070

PRAXAIR

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CERTIFICATE OF ANALYSIS

CUSTOMER HORIZON AIR MEASUREMENTS

DATE 03/11/04

P.O NUMBER

REF. NUMBER 15453700

REQUESTED COMPOSITION

GAS	CONCENTRATION
CARBON DIOXIDE	7 %
OXYGEN	12 %
NITROGEN	BALANCE
ANALYTICAL ACCURACY	±0.02%abs

ANALYTICAL METHOD

INSTRUMENT
METTLER ID5, S/N:1865166

ANALYTICAL PRINCIPLE
Gravimetric

Values not valid below 150 psig.

THIS CYLINDER NO.	SA 10110
CYLINDER PRESSURE	2000 PSIG
EXPIRATION DATE	03/11/07
CLASSIFICATION	PRIMARY STANDARD
BATCH NUMBER	N/A
LOT NUMBER	109331207
PART NUMBER	EV NICDOXP1-AS
CYLINDER SIZE	AS CGA 590 148 CFT

CERTIFIED CONCENTRATION

CARBON DIOXIDE	7.00 %
OXYGEN	11.98 %
NITROGEN	BALANCE
ANALYTICAL ACCURACY	±0.02%abs

ANALYZED BY

JACK FU

CERTIFIED BY

TY TRIPLETT

IMPORTANT

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CERTIFICATE OF ANALYSIS

CUSTOMER HORIZON AIR MEASUREMENTS

DATE 09/15/03

P.O NUMBER

REF. NUMBER 55946400

REQUESTED COMPOSITION

GAS	CONCENTRATION
CARBON DIOXIDE	12 %
NITROGEN	BALANCE
ANALYTICAL ACCURACY	±1 %

ANALYTICAL METHOD

INSTRUMENT
METTLER ID5, S/N:1865166

ANALYTICAL PRINCIPLE
GRAVIMETRIC

Values not valid below 150 psig.

THIS CYLINDER NO.	SA 17158
CYLINDER PRESSURE	2000 PSIG
EXPIRATION DATE	12/31/06
CLASSIFICATION	PRIMARY STANDARD
BATCH NUMBER	N/A
LOT NUMBER	109232903
PART NUMBER	EV NICD12P-AS
CYLINDER SIZE	AS CGA 580 145 CFT

CERTIFIED CONCENTRATION

CARBON DIOXIDE	11.98 %
NITROGEN	BALANCE
ANALYTICAL ACCURACY	±1 %

ANALYZED BY

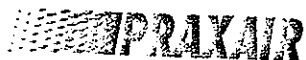
JACK FU

CERTIFIED BY

VICTOR DOTAN

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CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER HORIZON AIR MEASUREMENTS

P.O. NUMBER

REFERENCE STANDARD

COMPONENT

NIST SRM NO.

CYLINDER NO.

CONCENTRATION

NITRIC OXIDE GMIS

vs. SRM#1683

CC 95448

22.4 ppm

ANALYZER READINGS

R=REFERENCE STANDARD

Z=ZERO GAS

C=GAS CANDIDATE

1. COMPONENT		NITRIC OXIDE	GMIS	ANALYZER MAKE-MODEL-S/N		Thermo Env. 42H S/N 42H-44979-273			
ANALYTICAL PRINCIPLE		Chemiluminescence				LAST CALIBRATION DATE		09/01/02	
FIRST ANALYSIS DATE		08/28/02				SECOND ANALYSIS DATE		09/20/02	
Z	0	R	22.3	C	20.1	CONC.	20.2	Z	0
R	22.3	Z	0	C	20.2	CONC.	20.3	R	25.6
Z	0	C	20.2	R	22.4	CONC.	20.2	Z	0
U/M	ppm	MEAN TEST ASSAY		20.2		ppm	U/M	ppm	

NOx values for reference only.
All values not valid below 150 psig.

THIS CYLINDER NO. CC 150203

HAS BEEN CERTIFIED ACCORDING TO SECTION

OF TRACEABILITY PROTOCOL NO.

PROCEDURE

G1

CERTIFIED ACCURACY ± 1 % NIST TRACEABLE

CYLINDER PRESSURE 2000 PSIG

CERTIFICATION DATE 09/20/02

EXPIRATION DATE 09/20/04 TERM 24 MONTHS

CERTIFIED CONCENTRATION

NITRIC OXIDE	20.2 ppm
NITROGEN	BALANCE
NOx	20.4 ppm

ANALYZED BY

MICHAEL TSANG

CERTIFIED BY

PHU TIEN NGUYEN

IMPORTANT
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CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER HORIZON AIR MEASUREMENTS

P.O NUMBER 8197

REFERENCE STANDARD

COMPONENT
NITRIC OXIDE

NIST SRM NO.
vs. SRM2628a

CYLINDER NO.
CC 137315

CONCENTRATION
9.50 ppm

ANALYZER READINGS

R=REFERENCE STANDARD

Z=ZERO GAS

C=GAS CANDIDATE

1. COMPONENT NITRIC OXIDE		ANALYZER MAKE-MODEL-S/N		Thermo Env. 42H S/N 42H-44979-273	
ANALYTICAL PRINCIPLE		CHEMILUMINESCENCE		LAST CALIBRATION DATE 06/02/03	
FIRST ANALYSIS DATE		05/05/03		SECOND ANALYSIS DATE 06/06/03	
Z 0	R 10.74	C 11.19	CONC. 9.90	Z 0.01	R 9.34 C 9.73 CONC. 9.90
R 10.70	Z 0	C 11.20	CONC. 9.94	R 9.37	Z 0.01 C 9.80 CONC. 9.94
Z 0	C 11.21	R 10.72	CONC. 9.93	Z 0.01	C 9.83 R 9.37 CONC. 9.97
U/M ppm		MEAN TEST ASSAY	9.92	U/M ppm	MEAN TEST ASSAY 9.94

NOx = 9.93 ppm (For reference only).
All values not valid below 150 psig.

THIS CYLINDER NO.	CC 167634	CERTIFIED CONCENTRATION
HAS BEEN CERTIFIED ACCORDING TO SECTION	EPA-600/R97/121	NITRIC OXIDE 9.93 ppm
OF TRACEABILITY PROTOCOL NO.	Rev. 9/97	NITROGEN BALANCE
PROCEDURE G1		
CERTIFIED ACCURACY ± 2	% NIST TRACEABLE	
CYLINDER PRESSURE	2000 PSIG	
CERTIFICATION DATE	06/06/03	
EXPIRATION DATE	06/06/05	TERM 24 MONTHS

ANALYZED BY

JOSEPH CHARLES

CERTIFIED BY

MICHAEL TSANG

IMPORTANT

Information contained herein has been prepared at your request by qualified experts within Praxair Distribution, Inc. While we believe that the information is accurate within the limits of the analytical methods employed and is complete to the extent of the specific analyses performed, we make no warranty or representation as to the suitability of the use of the information for any particular purpose. The information is offered with the understanding that any use of the information is at the sole discretion and risk of the user. In no event shall the liability of Praxair Distribution, Inc., arising out of the use of the information contained herein exceed the fee established for providing such information.

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CERTIFICATE OF ANALYSIS

CUSTOMER HORIZON AIR MEASUREMENT

DATE 01/14/04

P.O NUMBER 8305

REF. NUMBER 58531700

REQUESTED COMPOSITION

GAS	CONCENTRATION
NITROGEN DIOXIDE (AS NOX)	19 ppm
NITROGEN	BALANCE
ANALYTICAL ACCURACY $\pm 1\%$	
NO	

ANALYTICAL METHOD

INSTRUMENT	ANALYTICAL PRINCIPLE
Thermo Env. 42H S/N 42H-44979-273	Chemiluminescence

VALUES NOT VALID BELOW 150 PSIG.
SRM UNCERTAINTY $\pm 1\%$
NO VALUE IS FOR REFERENCE ONLY.

THIS CYLINDER NO.	CC 118326
CYLINDER PRESSURE	2000 PSIG
EXPIRATION DATE	07/14/04
CLASSIFICATION	PRIMARY STANDARD
BATCH NUMBER	N/A
LOT NUMBER	109316003
PART NUMBER	EV NINK19MP-AS
CYLINDER SIZE	AS CGA 660 140 CFT

CERTIFIED CONCENTRATION

NITROGEN DIOXIDE (AS NOX)	18.9 ppm
NITROGEN	BALANCE
ANALYTICAL ACCURACY $\pm 1\%$	
NO 0.5 ppm	

ANALYZED BY

JOSEPH CHARLES

CERTIFIED BY

MICHAEL TSANG

IMPORTANT

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CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER HORIZON AIR MEASUREMENTS

P.O NUMBER 8078

REFERENCE STANDARD

COMPONENT	NIST SRM NO.	CYLINDER NO.	CONCENTRATION
CARBON MONOXIDE GMIS	vs. SRM#1679	CC 81440	99.1 ppm
NITRIC OXIDE GMIS	vs SRM#1684b	CC 115392	100.0 ppm

ANALYZER READINGS

R=REFERENCE STANDARD

Z=ZERO GAS

C=GAS CANDIDATE

1. COMPONENT	CARBON MONOXIDE	GMIS	ANALYZER MAKE-MODEL-S/N	Siemens Ultramat SE	S/N A12-729
ANALYTICAL PRINCIPLE		NDIR	LAST CALIBRATION DATE 11/14/02		
FIRST ANALYSIS DATE 12/02/02		SECOND ANALYSIS DATE 12/10/02			
Z 0.0	R 99.1	C 80.2	CONC. 80.2	Z 0.0	R 99.1 C 80.3 CONC. 80.3
R 99.1	Z 0.0	C 80.2	CONC. 80.2	R 99.1	Z 0.0 C 80.2 CONC. 80.2
Z 0.0	C 80.2	R 99.1	CONC. 80.2	Z 0.0	C 80.2 R 99.1 CONC. 80.2
U/M ppm	MEAN TEST ASSAY 80.2 ppm		U/M ppm	MEAN TEST ASSAY 80.2 ppm	
2. COMPONENT	NITRIC OXIDE	GMIS	ANALYZER MAKE-MODEL-S/N	Beckman 951A	S/N 0101354
ANALYTICAL PRINCIPLE		Chemiluminescence	LAST CALIBRATION DATE 12/08/02		
FIRST ANALYSIS DATE 12/02/02		SECOND ANALYSIS DATE 12/10/02			
Z 0.0	R 873.4	C 707.2	CONC. 81.0	Z 0.0	R 872.0 C 708.5 CONC. 81.2
R 874.6	Z 0.0	C 711.2	CONC. 81.3	R 872.3	Z 0.0 C 709.0 CONC. 81.3
Z 0.0	C 712.4	R 875.6	CONC. 81.4	Z 0.0	C 712.0 R 876.4 CONC. 81.2
U/M mV	MEAN TEST ASSAY 81.2 ppm		U/M mV	MEAN TEST ASSAY 81.2 ppm	

Values not valid below 150 psig.
NOx values for reference use only.

THIS CYLINDER NO. CC 92871
HAS BEEN CERTIFIED ACCORDING TO SECTION
OF TRACEABILITY PROTOCOL NO. EPA-600/R97/121 Rev. 9/97
PROCEDURE G1
CERTIFIED ACCURACY ± 1 % NIST TRACEABLE
CYLINDER PRESSURE 2000 PSIG
CERTIFICATION DATE 12/10/02
EXPIRATION DATE 12/10/04 TERM 24 MONTHS

CERTIFIED CONCENTRATION

CARBON MONOXIDE	80.2 ppm
NITRIC OXIDE	81.2 ppm
NITROGEN	BALANCE
NOx	81.8 ppm

ANALYZED BY

CHRIS VU

CERTIFIED BY

HELENA TRAN

IMPORTANT

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CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER HORIZON AIR

P.O NUMBER 8354

REFERENCE STANDARD

COMPONENT	NIST SRM NO.	CYLINDER NO.	CONCENTRATION
CARBON MONOXIDE GMIS	VS.SRM#1678	CC 81679	51.1 PPM
NITRIC OXIDE GMIS	vsSRM#1683b	CC 137710	48.0 ppm

ANALYZER READINGS

R=REFERENCE STANDARD

Z=ZERO GAS

C=GAS CANDIDATE

1. COMPONENT CARBON MONOXIDE GMIS		ANALYZER MAKE-MODEL-S/N Siemens Ultramat 5E S/N A12-729	
ANALYTICAL PRINCIPLE NDIR		LAST CALIBRATION DATE 03/01/04	
FIRST ANALYSIS DATE 03/19/04		SECOND ANALYSIS DATE 03/26/04	
Z 0.0	R 50.2	C 50.2	CONC. 50.2
R 50.2	Z 0.0	C 50.2	CONC. 50.2
Z 0.0	C 50.2	R 50.2	CONC. 50.2
U/M ppm		MEAN TEST ASSAY 50.2 ppm	
2. COMPONENT NITRIC OXIDE GMIS		ANALYZER MAKE-MODEL-S/N BECKMAN 951A S/N#0101354	
ANALYTICAL PRINCIPLE CHEMILUMINESCENCE		LAST CALIBRATION DATE 03/01/04	
FIRST ANALYSIS DATE 03/19/04		SECOND ANALYSIS DATE 03/26/04	
Z 0.0	R 458.5	C 477.0	CONC. 49.9
R 458.7	Z 0.0	C 477.3	CONC. 49.9
Z 0.0	C 477.5	R 459.4	CONC. 49.9
U/M mV		MEAN TEST ASSAY 49.9 ppm	

NOx VALUE FOR REFERENCE USE ONLY. ALL VALUES NOT VALID BELOW 150 psig.
FIRST CO ASSAY DONE AGAINST G.M.I.S.# CC 81679 (50.2 ppm CO/N2).

THIS CYLINDER NO. CC 100039		CERTIFIED CONCENTRATION	
HAS BEEN CERTIFIED ACCORDING TO SECTION EPA-600/R97/121		CARBON MONOXIDE	50.2 ppm
OF TRACEABILITY PROTOCOL NO. Rev. 9/97		NITRIC OXIDE	50.0 ppm
PROCEDURE G1		NITROGEN	BALANCE
CERTIFIED ACCURACY ± 1	% NIST TRACEABLE	NOx	50.4 ppm
CYLINDER PRESSURE 2000	PSIG		
CERTIFICATION DATE 03/26/04			
EXPIRATION DATE 03/26/06	TERM 24 MONTHS		

ANALYZED BY

CHRIS VU

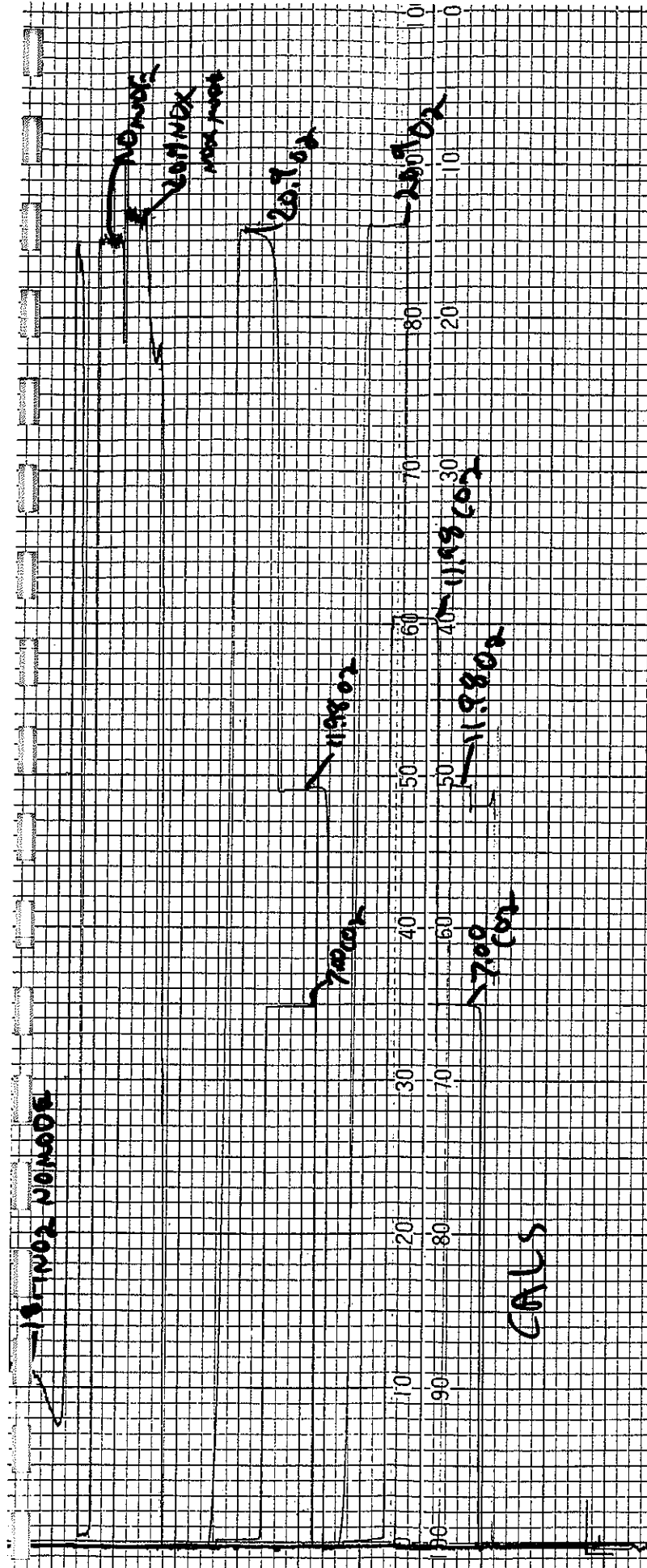
CERTIFIED BY

HELENA TRAN

IMPORTANT

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APPENDIX F - Strip Chart Data



4/20/2019

~~4-10-01~~ Flare #2

$\omega_0 = 7.0 \times 10^{20} \text{ s}^{-1}$
 $\omega_c = 1.2 \times 10^{20} \text{ s}^{-1}$

BRADLEY LANDFILL

- WASTE MANAGEMENT

30	40	50	60	70	80	90	100
11.98 O ₂	12.50 CO ₂	50		SA 100110			
11.98 CO ₂		50		SA 11858			
22.44 NOX				CC 150203			
9.13 NO _x				CC 167634			
18.1 NO ₂				CC 118926			
80.2 CO/8% NOX				CC 92871			
50.2 CO/50.4 NOX				CC 100039			

10

90

20

80

30

70

40

60

20

10

50220

9.93 NOX

20.4 NOX

9.17 NOX

10

90

20

80

30

70

40

60

20

10

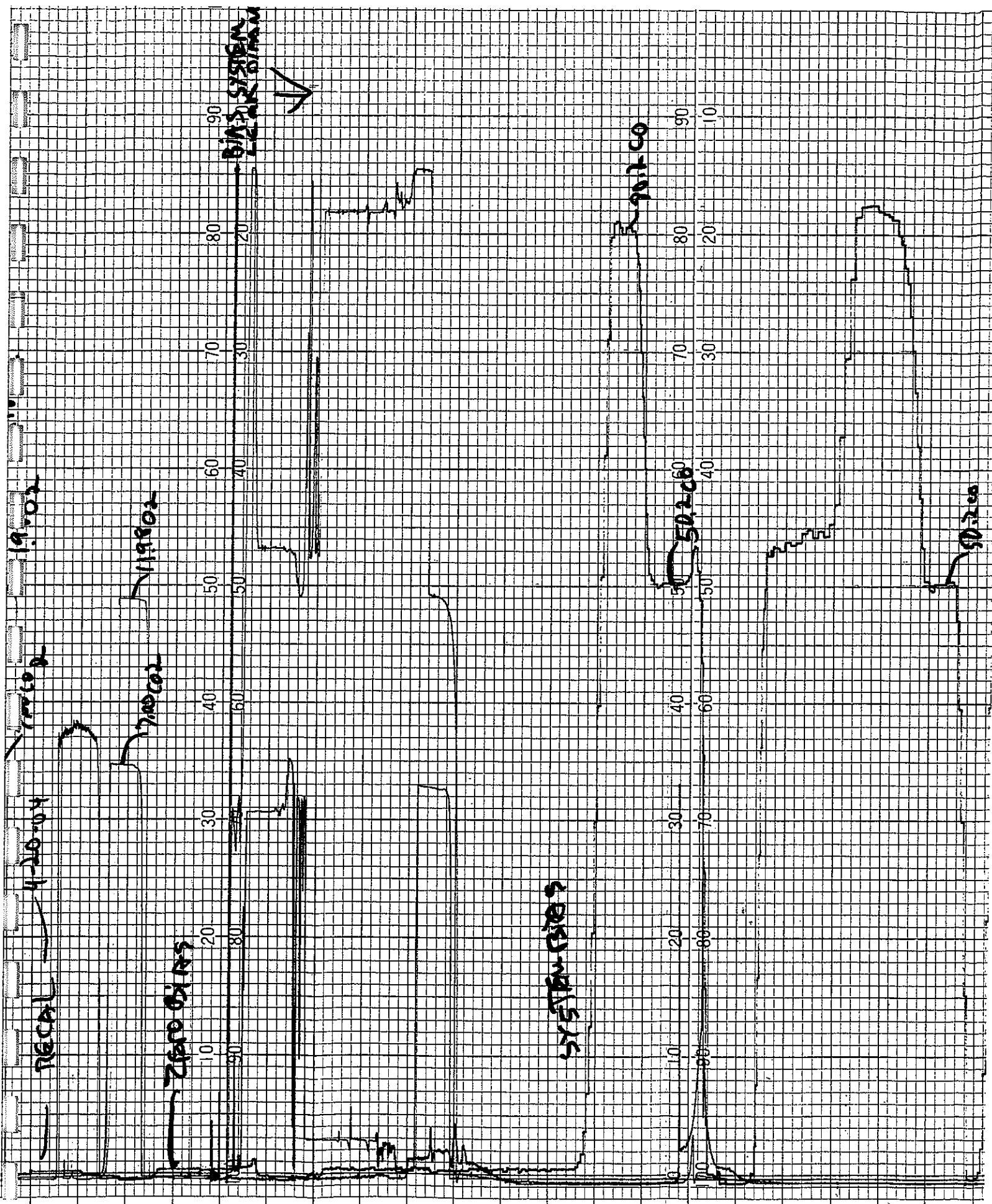
18.9 NO2 NOX NO2

18.9 NO2 NOX NO2

NO2 NOX NO2

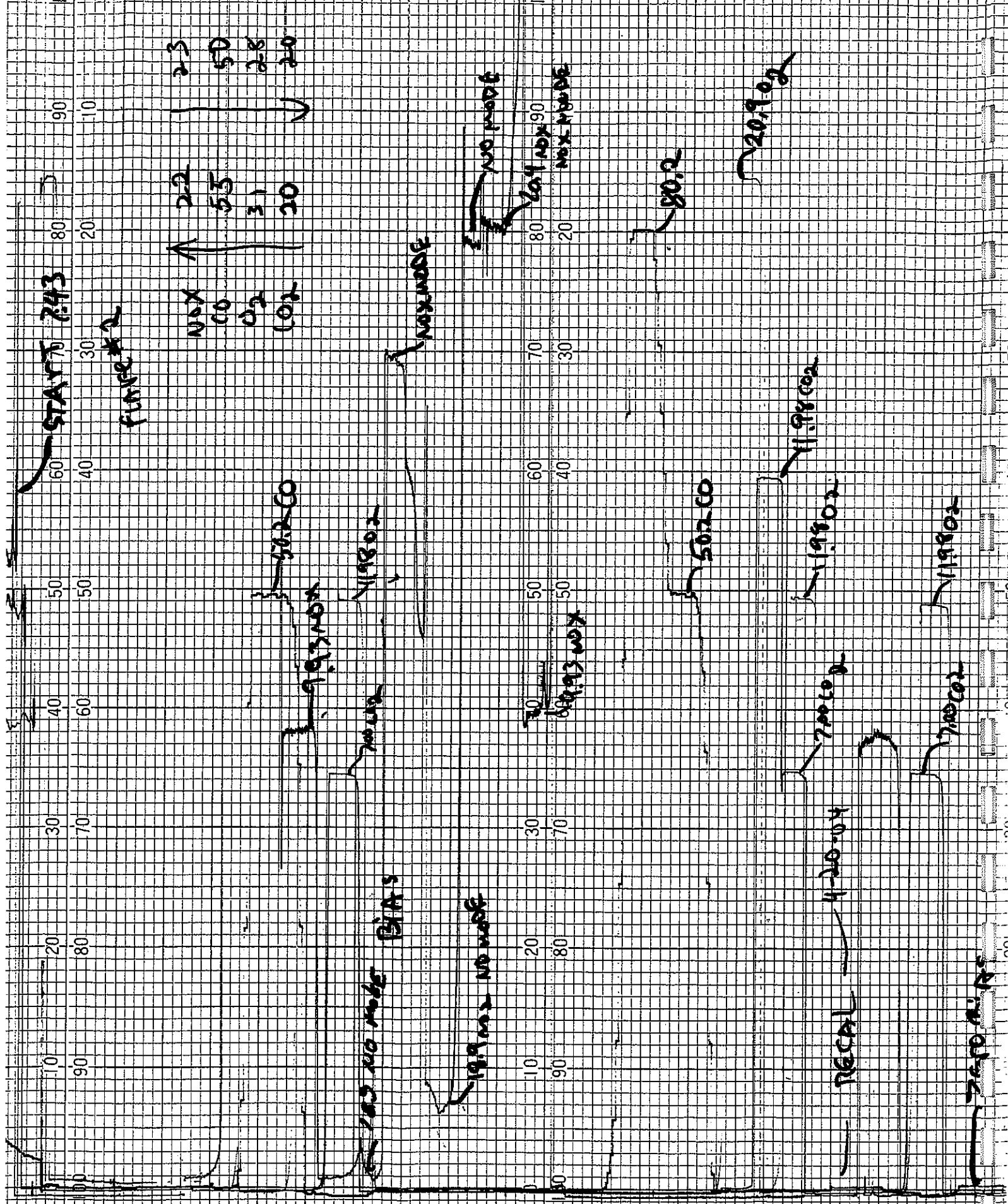
CHART PAPER
MISSING

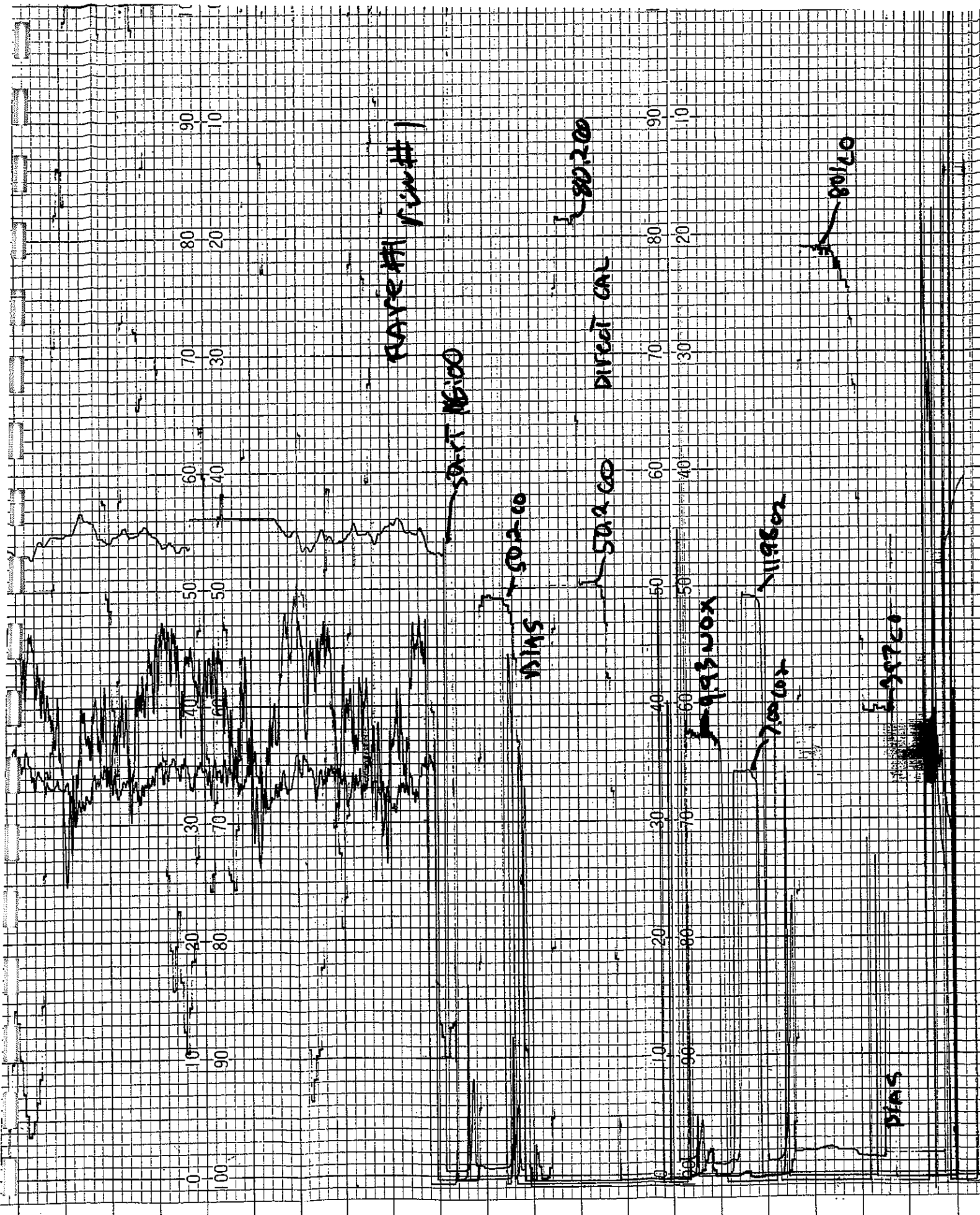




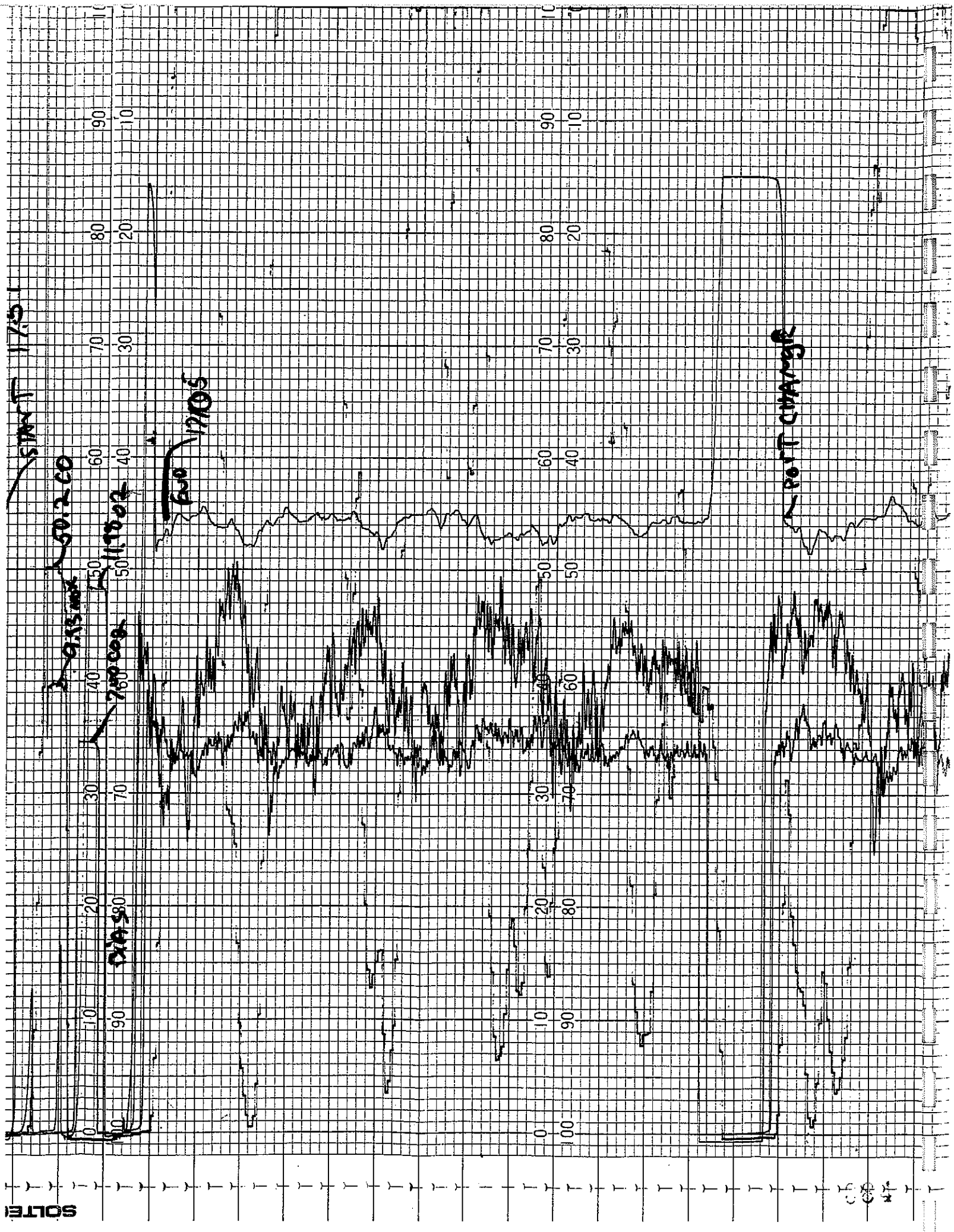
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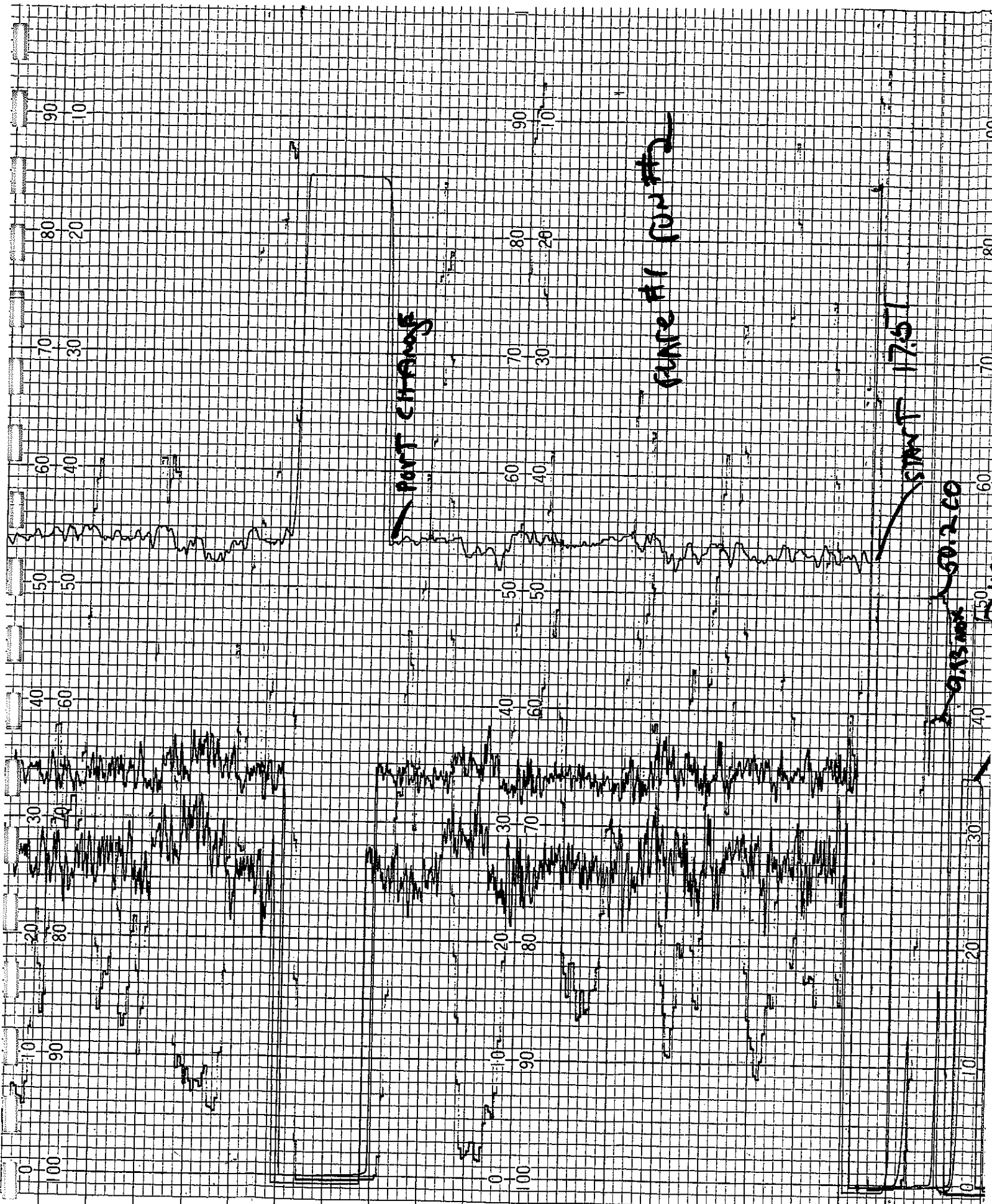
17. 18. 19.

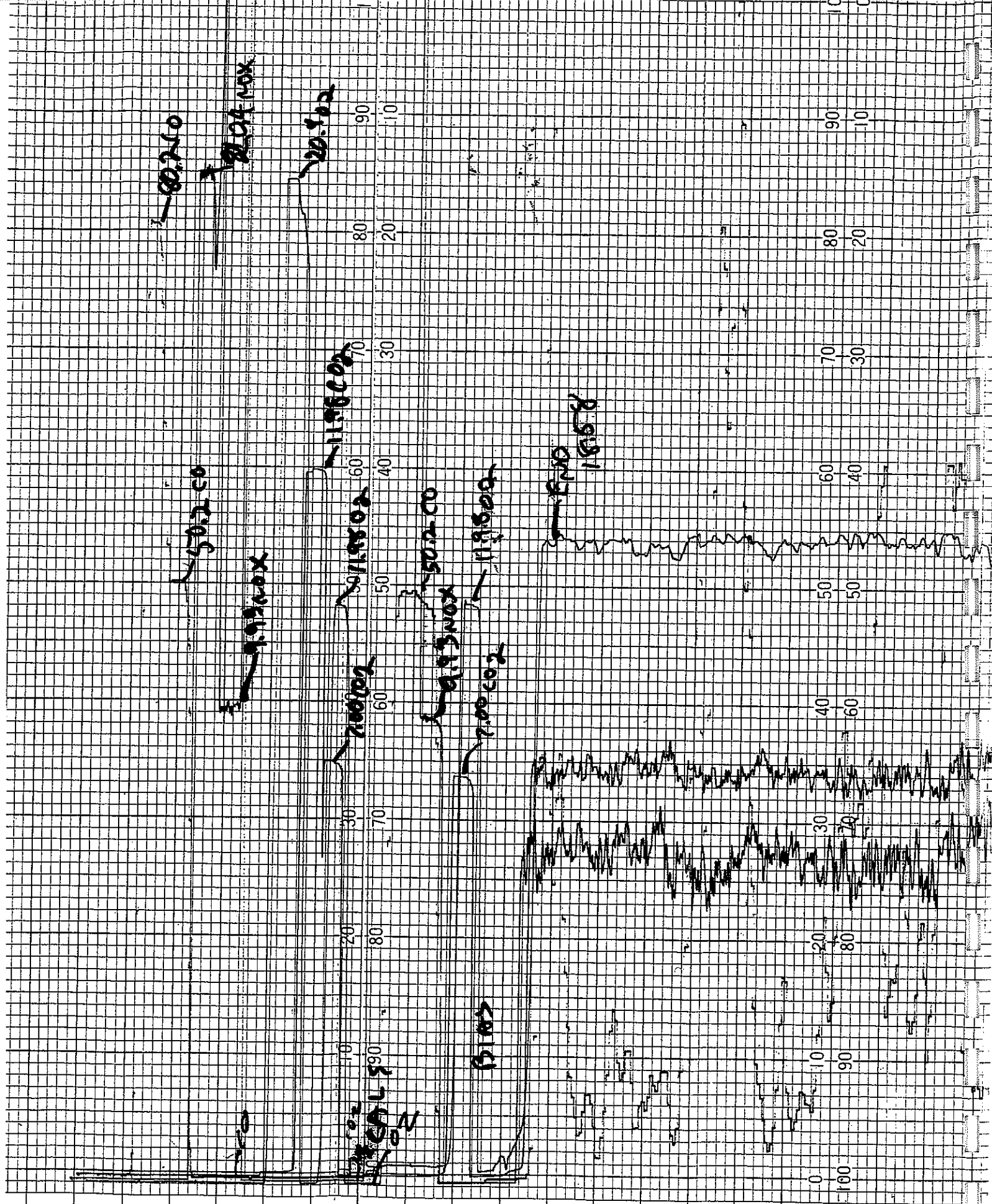




SOLITE







APPENDIX G - Process Data

04/20/04

LFG Run #1

Operating Data

CO
anal.

M

Run 1

911

e.s.

TIME	LFG Flow	Flow, °F	Cond Flow	
1400	3852	1681	3.1	1600
1405	3817	1701	3.1	1605
1410	3880	1698	3.1	1610
1415	3916	1686	3.1	1615
1420	3844	1674	3.1	1620
1425	3814	1692	3.1	1625
1430	3830	1661	3.1	1630
1436				
1446	3857	1689	3.1	1636
1451	3871	1671	3.1	1641
1456	3743	1673	3.1	1646
1501	3803	1676	3.1	1651
1506	3892	1659	3.1	1656
1511	3798	1656	3.1	1701
1516	3896	1655	3.1	
	Run 2	3844	1677	
1751	3856	1677	0.0	
1756	3863	1680	0.0	
1801	3770	1681	0.0	
1806	3774	1703	0.0	
1811	3804	1731	0.0	
1816	3837	1682	0.0	
1821	3807	1690	0.0	
1827	3760	1677	0.0	
1833	3646	1686	0.0	
1838	3757	1692	0.0	
1843	3817	1672	0.0	
1848	3802	1666	0.0	
1853	3720	1667	0.0	
1858	3716	1660	0.0	
	3729	1665	0.0	

auto shut-off low tank level, will fill when

APPENDIX H - Permit to Operate

Received 9/22/00

Granted as of 9/12/2000

LEGAL OWNER
OR OPERATOR:
BRADLEY LANDFILL AND RECYCLING CENTER
9081 TUJUNGA AVE P O BOX 39
SUN VALLEY, CA. 91352

ID 050310

Equipment Location: 9227 TUJUNGA AVE, SUN VALLEY, CA 91352-1542

Equipment Description:

LANDFILL GAS FLARING SYSTEM NO. 1 CONSISTING OF:

1. LIQUID KNOCKOUT/PARTICULATE REMOVAL VESSEL, JOHN ZINK, 2'-6" DIA. X 6'-0" H.
2. TWO BLOWERS, ONE STANDBY, LANDFILL GAS, EACH 200 HP, EACH 5,556 SCFM MAXIMUM FLOW RATE.
3. FLARE NO. 1, JOHN ZINK, 13'-0" DIA. X 60'-0" H, WITH A MULTI-JET BURNER, A PROPANE GAS PILOT, ELECTRIC IGNITER, UV FLAME SENSOR, THERMOCOUPLE WITH TEMPERATURE INDICATOR AND RECORDER, AUTOMATIC SHUTDOWN AND ALARM SYSTEM, AUTOMATIC COMBUSTION AIR REGULATING SYSTEM, TEMPERATURE CONTROLLER AND FLAME ARRESTOR.

Conditions:

- 1) OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN ACCORDANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION UNDER WHICH THIS PERMIT IS ISSUED UNLESS OTHERWISE NOTED BELOW.
- 2) THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITION AT ALL TIMES.
- 3) THIS EQUIPMENT SHALL BE OPERATED AND MAINTAINED BY PERSONNEL PROPERLY TRAINED IN ITS OPERATION.

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- 4) THE START-UP FOR THIS FLARE SHALL NOT EXCEED 30 MINUTES. ANY OUTAGE THAT RESULTS IN THE SHUTDOWN OF THE FLARE OR GAS COMPRESSOR AND THE SUBSEQUENT START-UP OR RESTART OF THE FLARE OR THE COMPRESSOR IS NOT CONSIDERED A BREAKDOWN, PROVIDING NO RAW LANDFILL GAS EMISSIONS OCCUR.
- 5) THE FLARE SHALL BE EQUIPPED WITH A TEMPERATURE INDICATOR AND RECORDER WHICH MEASURES AND RECORDS THE GAS TEMPERATURE (IN DEGREES F) IN THE FLARE STACK. THE TEMPERATURE INDICATOR AND RECORDER SHALL OPERATE WHENEVER THE FLARE IS IN OPERATION.
- 6) WHENEVER THE FLARE IS IN OPERATION, A TEMPERATURE OF NOT LESS THAN 1500 DEGREES F, AS MEASURED BY THE TEMPERATURE INDICATOR SHALL BE MAINTAINED IN THE FLARE STACK EXCEPT DURING START-UP TIME FOR NOT MORE THAN 30 MINUTES. THE THERMOCOUPLE USED TO MEASURE THE TEMPERATURE SHALL BE ABOVE THE FLAME ZONE AND AT LEAST 3 FEET BELOW THE TOP OF THE FLARE SHROUD AND AT LEAST 0.6 SECONDS DOWNSTREAM OF THE BURNER.
- 7) THE FLARE SHALL BE EQUIPPED WITH A FAILURE ALARM WITH AN AUTOMATIC BLOWER AND LANDFILL GAS SUPPLY VALVE SHUT-OFF SYSTEM APPROVED BY THE AQMD, IN ORDER TO ISOLATE THE FLARE FROM THE LANDFILL GAS SUPPLY LINE, TO SHUT-OFF THE BLOWER AND TO NOTIFY A RESPONSIBLE PARTY OF THE FAILURE.
- 8) THE SHUT-OFF SAFETY SYSTEM SHALL BE TESTED ANNUALLY FOR PROPER OPERATION AND THE RESULTS RECORDED.
- 9) A FLOW INDICATING AND RECORDING DEVICE SHALL BE INSTALLED IN THE LANDFILL GAS SUPPLY LINE TO THE FLARE TO MEASURE AND RECORD THE QUANTITY OF LANDFILL GAS (IN SCFM) BEING BURNED.
- 10) ALL RECORDING DEVICES SHALL BE SYNCHRONIZED WITH RESPECT TO THE TIME OF DAY.
- 11) A PRESSURE DIFFERENTIAL INDICATOR SHALL BE MAINTAINED ACROSS THE FLAME ARRESTOR.
- 12) CONDENSATE INJECTED INTO THE FLARE SHALL NOT EXCEED 5 GPM.
- 13) THE TOTAL VOLUME OF LANDFILL GAS BURNED IN THE FLARE SHALL NOT EXCEED 5,556 STANDARD CUBIC FEET PER MINUTE.
- 14) EMISSIONS RESULTING FROM THE FLARE SHALL NOT EXCEED THE FOLLOWING:

POLLUTANT	LBS/HOUR
ROG	1.86
NOX (AS NO2)	10.0
SOX (AS SO2)	8.44
CO	33.3
PM10	3.0

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Application No.

370136

- 15) EMISSIONS OF NOX FROM THE FLARE SHALL NOT EXCEED 0.06 LBS PER MILLION BTU OF HEAT.
- 16) A SUFFICIENT NUMBER OF SIGHT GLASS WINDOWS SHALL BE INSTALLED IN THE FLARE TO ALLOW VISUAL INSPECTION OF THE FLAME AND THERMOCOUPLE LOCATION WITHIN THE FLARE AT ALL TIMES. ADEQUATE AND SAFE ACCESS SHALL BE PROVIDED FOR ALL PORTS UPON REQUEST BY AQMD PERSONNEL.
- 17) A SET OF FOUR SAMPLING PORTS SHALL BE INSTALLED IN THE FLARE SHROUD AND LOCATED AT LEAST TWO FEET ABOVE THE FLAME ZONE AND AT LEAST THREE FEET BELOW THE TOP OF THE FLARE SHROUD. EACH PORT SHALL BE INSTALLED AT 90 DEGREES APART AND SHALL CONSIST OF FOUR INCH COUPLINGS. ADEQUATE AND SAFE ACCESS TO ALL TEST PORTS SHALL BE PROVIDED BY THE APPLICANT WITHIN 24 HOURS OF A REQUEST BY THE AQMD TO CONDUCT A TEST.
- 18) A SAMPLING PORT, OR OTHER METHOD APPROVED BY THE AQMD, SHALL BE INSTALLED AT THE INLET GAS LINE TO THE FLARE.
- 19) THE SKIN TEMPERATURE OF THE FLARE SHROUD WITHIN FOUR FEET OF ALL THE SOURCE TEST PORTS SHALL NOT EXCEED 250 DEGREES F. IF A HEAT SHIELD IS REQUIRED TO MEET THIS REQUIREMENT, ITS DESIGN SHALL BE APPROVED BY THE AQMD PRIOR TO CONSTRUCTION. THE HEAT SHIELD, IF REQUIRED TO MEET THE TEMPERATURE REQUIREMENT, SHALL BE IN PLACE WHENEVER A SOURCE TEST IS CONDUCTED BY THE AQMD.
- 20) THE APPLICANT SHALL CONDUCT A SOURCE TEST ANNUALLY OR PER THE APPROVED 1150.1 COMPLIANCE PLAN. THE TEST SHALL BE PERFORMED IN ACCORDANCE WITH AQMD APPROVED TEST PROCEDURES. THE TEST SHALL INCLUDE, BUT MAY NOT BE LIMITED TO, A TEST OF THE FLARE FOR:
 - A. LANDFILL GAS COMPOSITION AND HEATING VALUE (INLET)
 - B. LANDFILL GAS FLOW RATE, SCFM (INLET)
 - C. TOTAL SULFUR COMPOUNDS AS H₂S, PPMV (INLET)
 - D. TEMPERATURE, F (EXHAUST)
 - E. FLOW RATE, DSCFM (EXHAUST)
 - F. NOX, LBS/HR AND LBS/MMBTU (EXHAUST)
 - G. SOX, LBS/HR (EXHAUST)
 - H. CO, LBS/HR (EXHAUST)
 - I. PM, LBS/HR AND GR/DSCF (EXHAUST)
 - J. TOTAL NON-METHANE ORGANICS, LBS/HR (INLET AND EXHAUST)
 - K. RULE 1150.1 TOXIC COMPOUNDS, PPMV (INLET AND EXHAUST)

THE SOURCE TEST SHALL BE CONDUCTED AT THE MAXIMUM FLOW RATE AVAILABLE AT THE TIME OF THE TEST BUT NOT TO EXCEED THE FLOW RATE ALLOWED BY THIS PERMIT.

- 21) ANY BREAKDOWN OR MALFUNCTION OF THE LANDFILL GAS FLARE RESULTING IN THE EMISSION OF RAW LANDFILL GAS SHALL BE REPORTED TO THE AQMD WITHIN ONE HOUR AFTER OCCURRENCE, AND IMMEDIATE REMEDIAL MEASURES SHALL BE UNDERTAKEN TO CORRECT THE PROBLEM AND PREVENT FURTHER EMISSIONS INTO THE ATMOSPHERE.

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- 22) ALL RECORDS SHALL BE KEPT FOR A PERIOD OF AT LEAST TWO YEARS AND SHALL BE MADE AVAILABLE TO AQMD PERSONNEL UPON REQUEST. A RECORD OF THE HOURS OF FLARE OPERATION SHALL BE INCLUDED.

Approval or denial of this application for permit to operate the above equipment will be made after an inspection to determine if the equipment has been constructed in accordance with the approved plans and specifications and if the equipment can be operated in compliance with all Rules of the South Coast Air Quality Management District.

Please notify TED KOWALCZYK at (909) 396-2592 when construction of equipment is complete.

This Permit to Construct is based on the plans, specifications, and data submitted as it pertains to the release of air contaminants and control measures to reduce air contaminants. No approval or opinion concerning safety and other factors in design, construction or operation of the equipment is expressed or implied.

This Permit to Construct shall serve as a temporary Permit to Operate provided the Executive Officer is given prior notice of such intent to operate.

This Permit to Construct will become invalid if the Permit to Operate is denied or if the application is cancelled. THIS PERMIT TO CONSTRUCT SHALL EXPIRE ONE YEAR FROM THE DATE OF ISSUANCE unless an extension is granted by the Executive Officer.

DMB/tk01

Dorris M. Bailey
DORRIS M. BAILEY
Principal Office Assistant

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